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Meyer® ELECTRO-LIFT

ELECTRO LIFT® power units service manual

MODELS
E-46, E-46H
E-47, E-47H
E-57, E-57H

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FOREWARD

This Service Manual includes complete information for servicing the following Electro Lift® Units:

E - 46 and E - 46H

E - 47 and E - 47H

E - 57 and E - 57H

The information is grouped according to the type of work being performed, such as diagnosis and testing, disassembly and reassembly. Special tools and specifications are also included in this manual.

All information, illustrations and product descriptions contained in this manual are correct at publication time. We do, however, reserve the right to make changes at any time without prior notice.

MEYER PRODUCTS INC.

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Meyer Products Inc. reserves the right, under its continuing product improvement program, to change construction or design details, specifications and prices without notice or without incurring any obligation.

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GENERAL INFORMATION

Model Identification

The Electro Lift® unit is an electrically powered hydraulic mechanism specifically designed for use with the Meyer Snow Plow and is available in four models as follows:

E-46	Raises and lowers plow hydraulically (2-way) and is used with TM, ST and C series Snow Plows.
E-46H	Raises and lowers plow hydraulically (2-way) and is used with HM series Snow Plows.
E-47/E-57	Raises, lowers and angles plow hydraulically (7-way) and is used with TM, ST and C series Snow Plows.
E-47H/E-57H	Raises, lowers and angles plow hydraulically (7-way) and is used with the MDII, HM and Diamond series Snow Plows.

Model Identification and Serial Number Location

Inclusion of the model number and serial number is extremely important when writing up warranty claim forms and product report forms for proper evaluation and follow up.

The basic model number is located on the name plate located as shown in Figure 0-1. To determine whether it is the standard or "H" model, measure the dimension shown in Figure 0-1. The serial number is located on the bottom of the base or on the name plate.

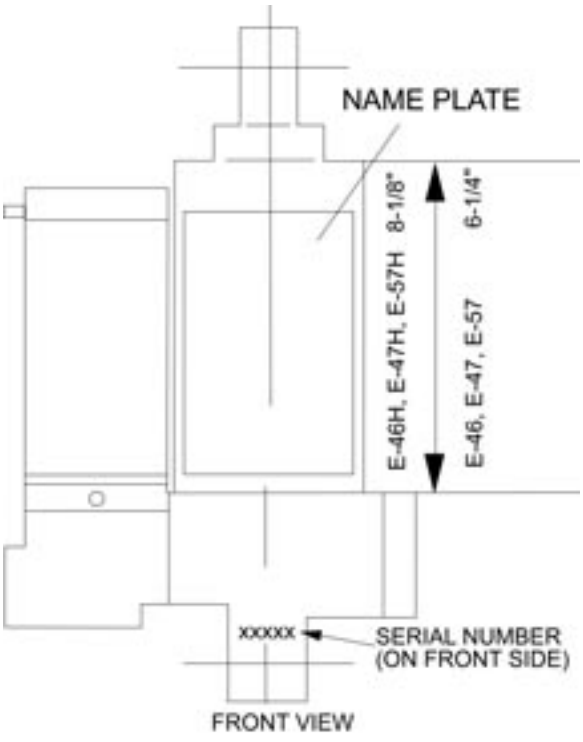

FIGURE 0 -1

Motor Identification

Three different brand motors are used on the Electro Lift® units American Bosch, Prestolite and Iskra. Proper identification of the brand and supplier part number is necessary when seeking local parts and service sources.

The motor with which a specific Electro Lift® unit is equipped can be identified by the distinctive characteristics shown in figure 0-2.

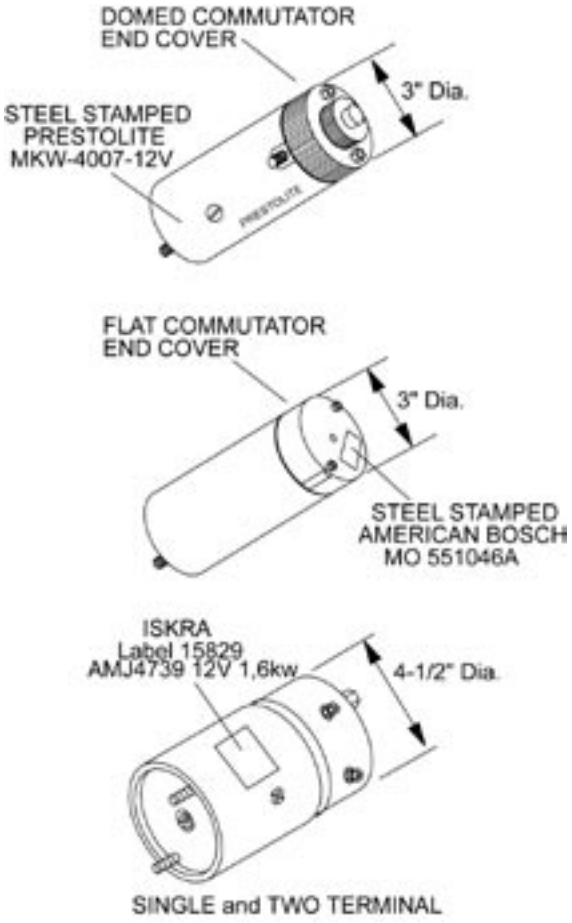

FIGURE 0-2

MAINTENANCE

The following maintenance information is intended as a basic guide for providing the Electro Lift® unit with the proper service and care. Sustained heavy duty operation or operating under adverse conditions may necessitate more frequent servicing.

General Maintenance

Cleanliness

The greatest enemy to any hydraulic system is dirt or contamination. Therefore, cleanliness must be stressed at the time of installation, servicing and repairing.

Vehicle Electrical System

Maximum performance and efficiency of the Electro Lift® unit requires that the vehicle's electrical system be properly maintained and consist of:

Battery - ..... 70 Amp. Hr. Minimum or 550 Cold Cranking Amps.
Alternator ..... 60 Amp. Minimum

Check Regularly

1. Battery Terminals - Must be clean and free of corrosion.
2. Electrical Connections - Must be free of corrosion and tight.
3. Battery - Must be in first-class condition.
4. Alternator (or Generator) and Regulator - Must be functioning to specifications.
5. Hydraulic Fluid Reservoir Level - A significant drop in hydraulic fluid level indicates a leak which must be located and corrected. Insufficient hydraulic fluid may result in severe damage.

POST-SEASON MAINTENANCE

Meyer Hydraulic Fluid M-1.

Meyer Hydraulic Fluid M-1 is a specially formulated mineral oil which maintains an almost constant viscosity from normal to sub-zero temperatures. Because it remains free flowing at extremely low temperatures, the performance and efficiency are not affected.

Meyer Hydraulic Fluid M-1 also contains an additive which neutralizes moisture accumulating in the fluid due to condensation. It is effective for a maximum of one year's use.

Meyer Products Inc. will not be liable for damages resulting from the use of inferior or other fluids or oils.

Replacement of Hydraulic Fluid

After a season's use, completely drain the hydraulic fluid (including hydraulic fluid in hoses and cylinders on Power Angling models). Drain fluid through filler hole shown in Figure 0-3 or drain hole in base by completely retracting lift rod and unbolting unit to pour fluid out or using a suction pump. On Power Angling models, disconnect the fittings at the Angling cylinders, completely retract the cylinder rods and purge cylinders and hoses of all hydraulic fluid. Flush the complete system including unit, hoses and Power Angling rams with a non wax (Napthenic) cleaner. If kerosene (Parrafinic) is used to flush the system, the system must be flushed again to remove any kerosene with a (Napthenic) based cleaner that is wax free .

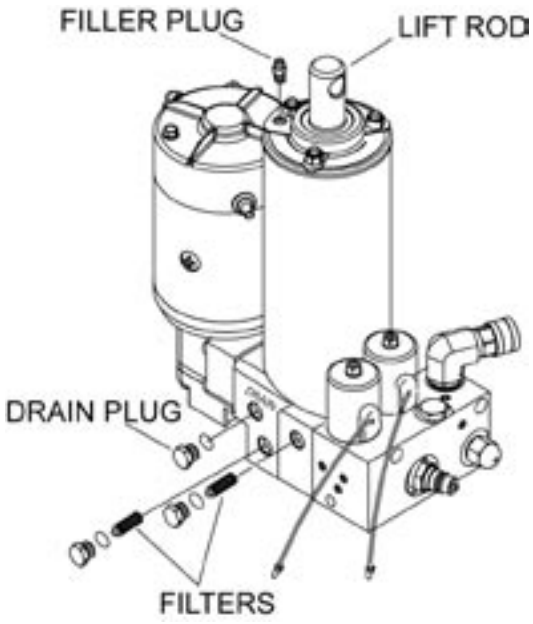

FIGURE 0-3

Refill Electro Lift® unit with M-1 Fluid by fully retracting lift rod (Ram) and filling reservoir to 1-1/2 " below the filler hole. On Power Angling models, fill and bleed hoses and Power Angling cylinders by loosening hydraulic fittings at cylinders until they leak. Power angle plow repeatedly from one side to the other until fluid flows steadily from the leaking fittings while maintaining a constant check on the reservoir fluid level.

Raise and lower the plow several times and with lift rod fully retracted, give a final check to the fluid level and replace filler plug.

Filters

Clean the two filters (only one in E-46 and E-46H; two in Power Angling units) located in base of unit with mineral spirits or equivalent and blow out with compressed air. See Figure 0-3 for filter locations.

Protection Against Rust and Corrosion

When the Electro Lift® unit is not used for extended periods, protect the chromed lift rod (Ram) by fully extending it and coating it with chassis lubricant. Full extension of the lift rod (Ram) fills the cylinder with hydraulic fluid. On Power Angling models, coat the exposed portions of the Power Angling cylinder rods (Rams) with chassis lubricant to protect them against rust and corrosion.

SECTION 1 - GENERAL DESCRIPTION AND THEORY OF OPERATION

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GENERAL DESCRIPTION

Electro Lift® unit is an electrically powered and electrically controlled hydraulic mechanism specifically designed for use with Meyer Snow Plows. The standard model E-46 raises and lowers the plow hydraulically with an integral 6" stroke hydraulic cylinder while the model E-46H performs the identical task for larger plows with an integral 8" stroke hydraulic cylinder.

In addition to raising and lowering the plow hydraulically, the model E-47, E-47H and E-57, E-57H angles the plow hydraulically, left and right, via remote hydraulic cylinders.

The Electro Lift® unit consists of a specially designed high torque 12-volt DC motor which is directly coupled to a gear-type hydraulic pump. The pump obtains its supply of hydraulic fluid from an integral reservoir which totally surrounds the integral hydraulic cylinder which raises and lowers the plow.

Included in all models is an electrically controlled and powered solenoid valve cartridge "A" which is energized to allow the plow to lower by gravity.

The models E-47 and E-57 include an integral valve body which contains two additional electrically controlled solenoid valve cartridges. Solenoid valve cartridge "B" is energized to route the pressurized hydraulic fluid to the integral hydraulic cylinder to raise the plow. Solenoid valve cartridge "C" is energized to route the pressurized hydraulic fluid to the left remote hydraulic cylinder to angle the plow to the right. Angling the plow to the left only requires energizing the electric motor since the normal route for the pressurized hydraulic fluid is to the right remote hydraulic cylinder.

Additional components which control and supply electrical current to the Electro Lift® unit are an operator controlled toggle switch; a solenoid switch to supply high amperage current to the unit's motor; a wiring harness to distribute low amperage current between the toggle switch or switches, motor solenoid and the solenoid valve cartridge(s); and short heavy gauge cables to distribute high amperage current directly from the positive terminal of the vehicle's battery and ground the unit directly to the negative terminal of the vehicle's battery.

THEORY OF OPERATION

FUNCTIONS

The Electro Lift® models perform basic functions. Because certain of these basic functions are accomplished differently in the models E-46 and E-46H as opposed to the Power Angling models will be treated separately where necessary.

Models E-46 and E-46H

The two basic functions performed are:

- Raise snow plow
- Lower snow plow and float

Refer to Figures 1-1 and 1-2 (pages 6 thru 9) for electrical and hydraulic flow chart for each function. Each figure explains which component is actuated and related in each function.

Models E-47, E-47H and E-57, E-57H

The four basic functions performed are:

- Raise snow plow
- Lower snow plow
- Angle snow plow to right
- Angle snow plow to left

Refer to Figures 1-3 through 1-6 (pages 6 thru 18) for electrical and hydraulic flow chart for each function. Each figure explains which component is actuated and related in each function.

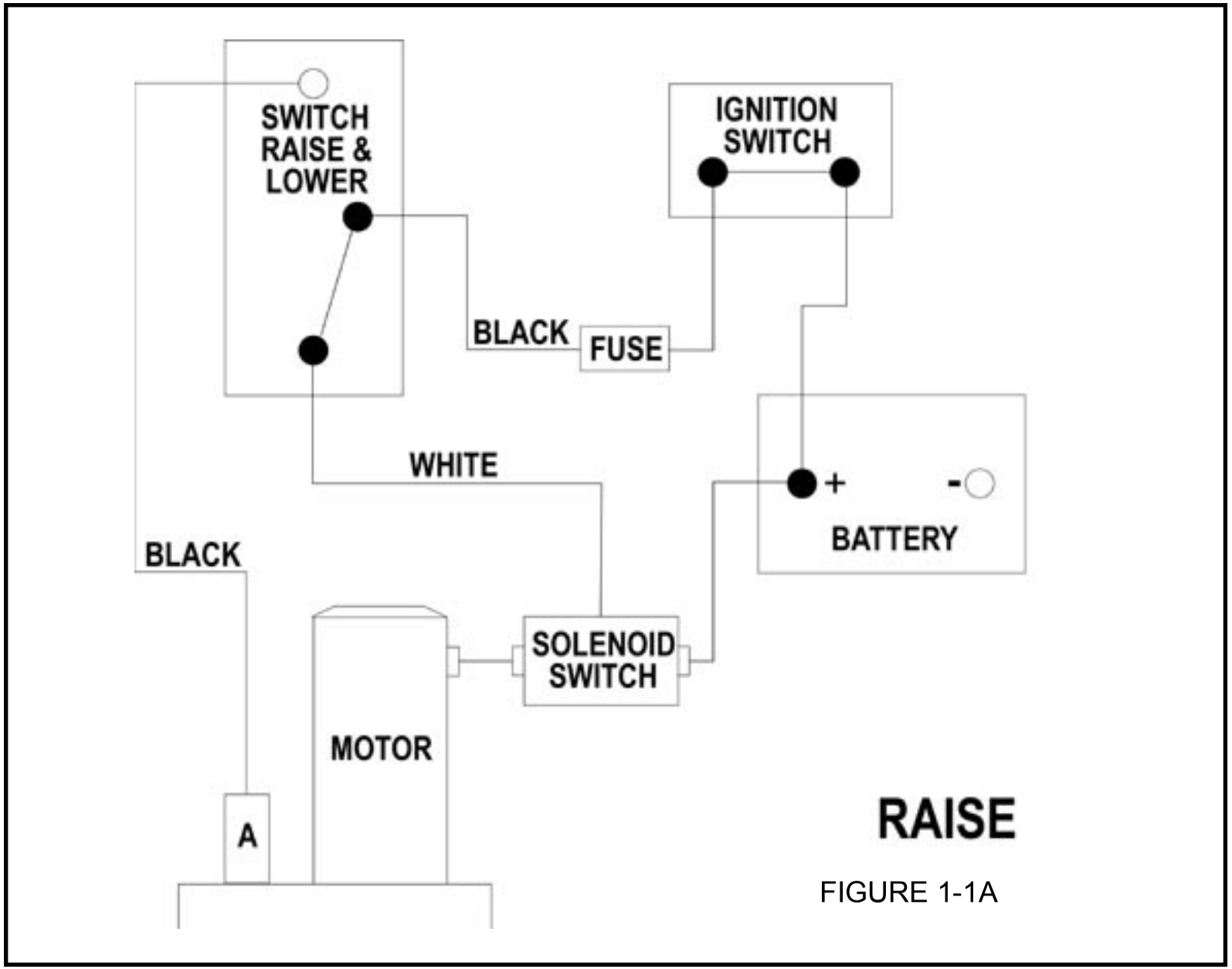

SWITCH
RAISE &
LOWER
IGNITION
SWITCH
BLACK
FUSE
WHITE
+
-
BATTERY
BLACK
SOLENOID
SWITCH
MOTOR
A
RAISE

FIGURE 1-1A

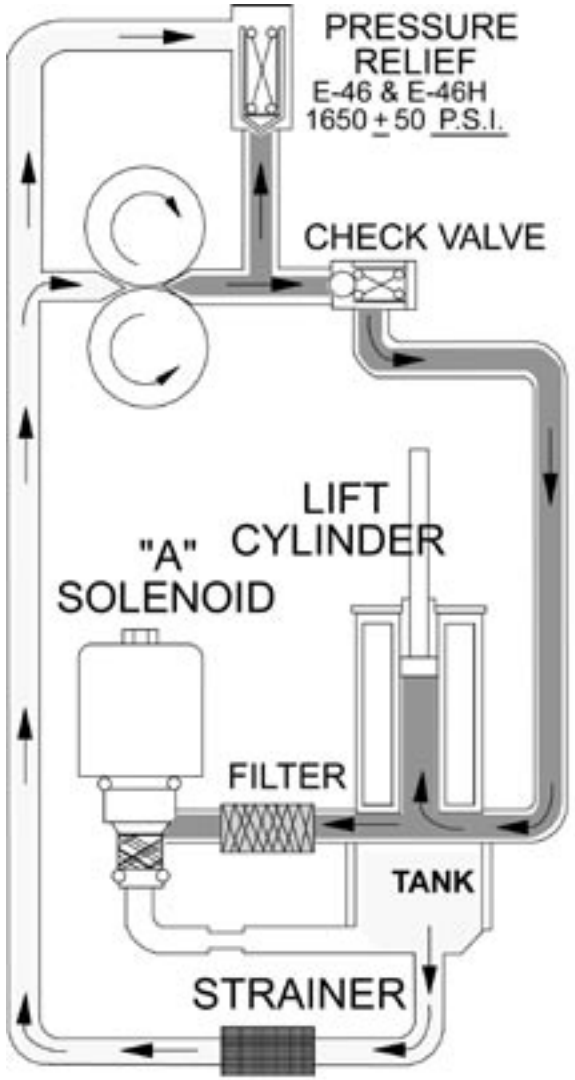
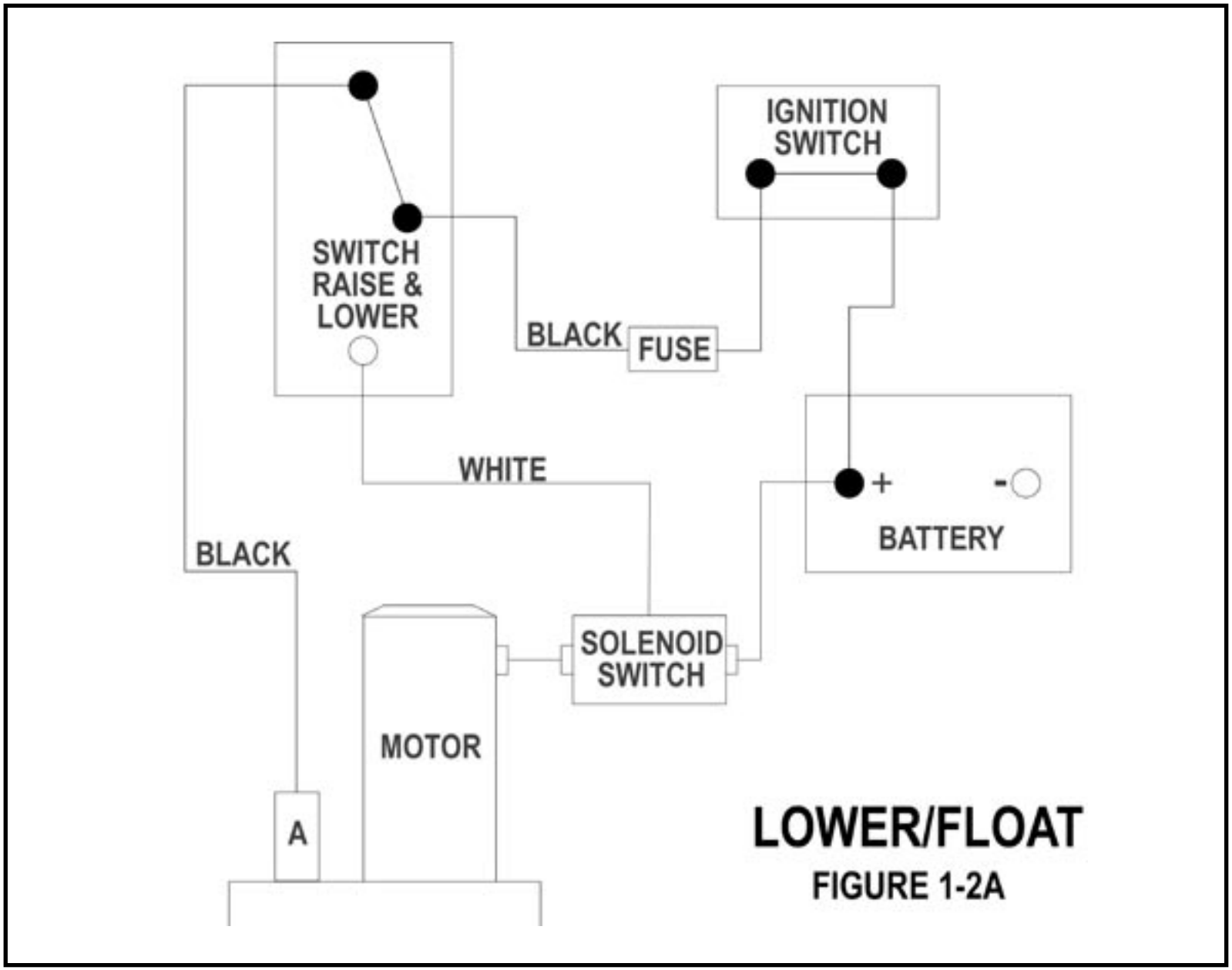


FIGURE 1-1B

- OPERATING
- RETURN
- INTAKE or DRAIN

HYDRAULIC FLOW CHART
MODELS E-46 & E-46H
RAISE



LOWER/FLOAT

FIGURE 1-2A

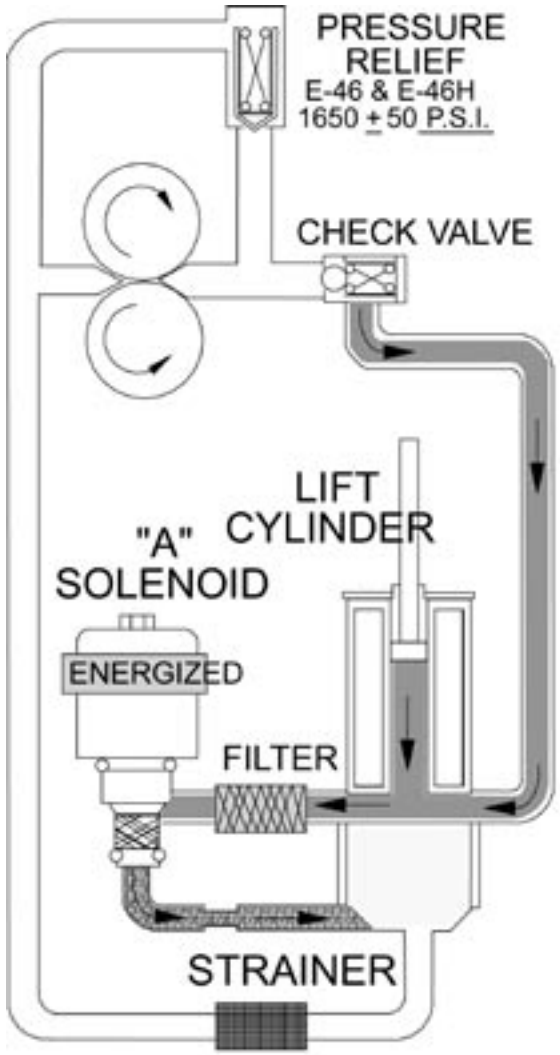
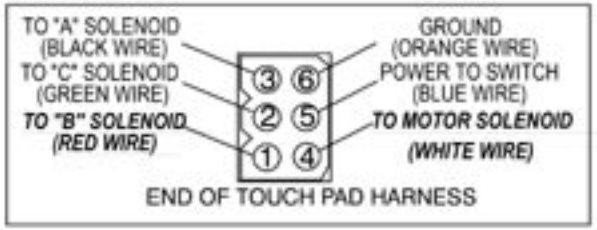


FIGURE 1-2B

- OPERATING
- RETURN
- INTAKE or DRAIN

HYDRAULIC FLOW CHART
MODELS E-46 & E-46H
LOWER/FLOAT

ELECTRO -TOUCH CONTROLLER



RAISE

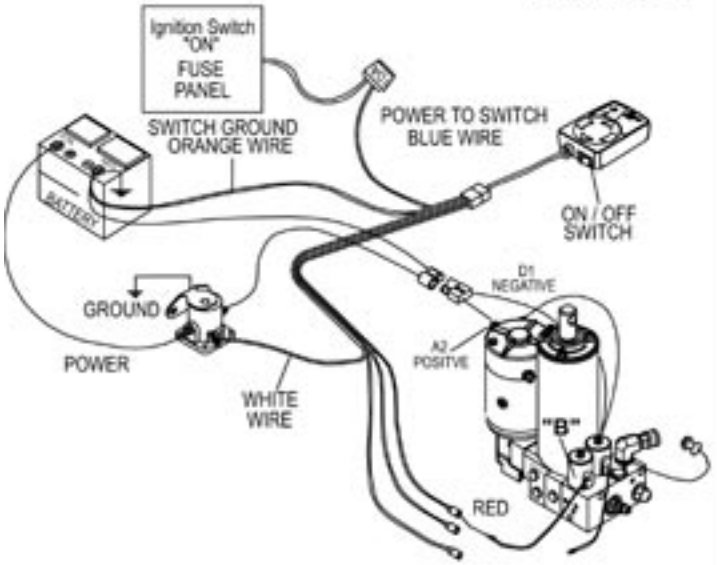


FIGURE 1-3A

SLIK - STIK SINGLE LEVER CONTROLLER

RAISE

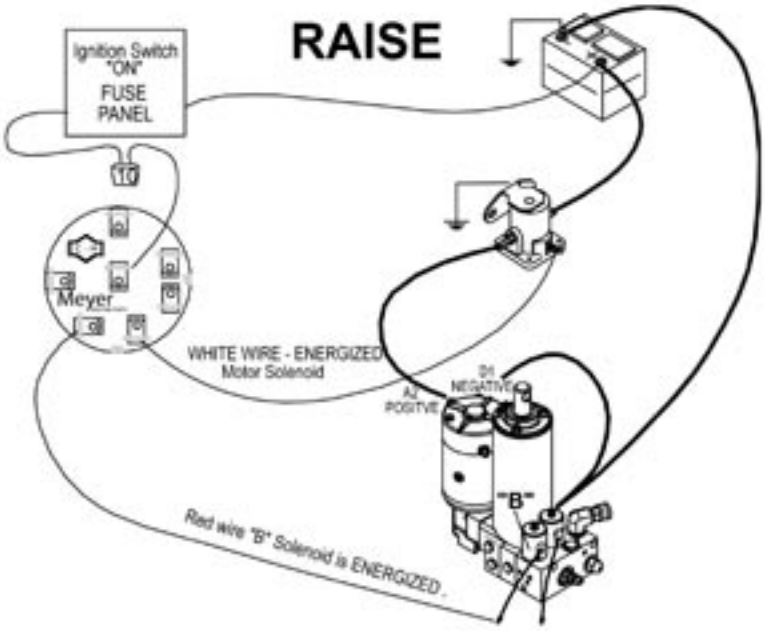


FIGURE 1-3A

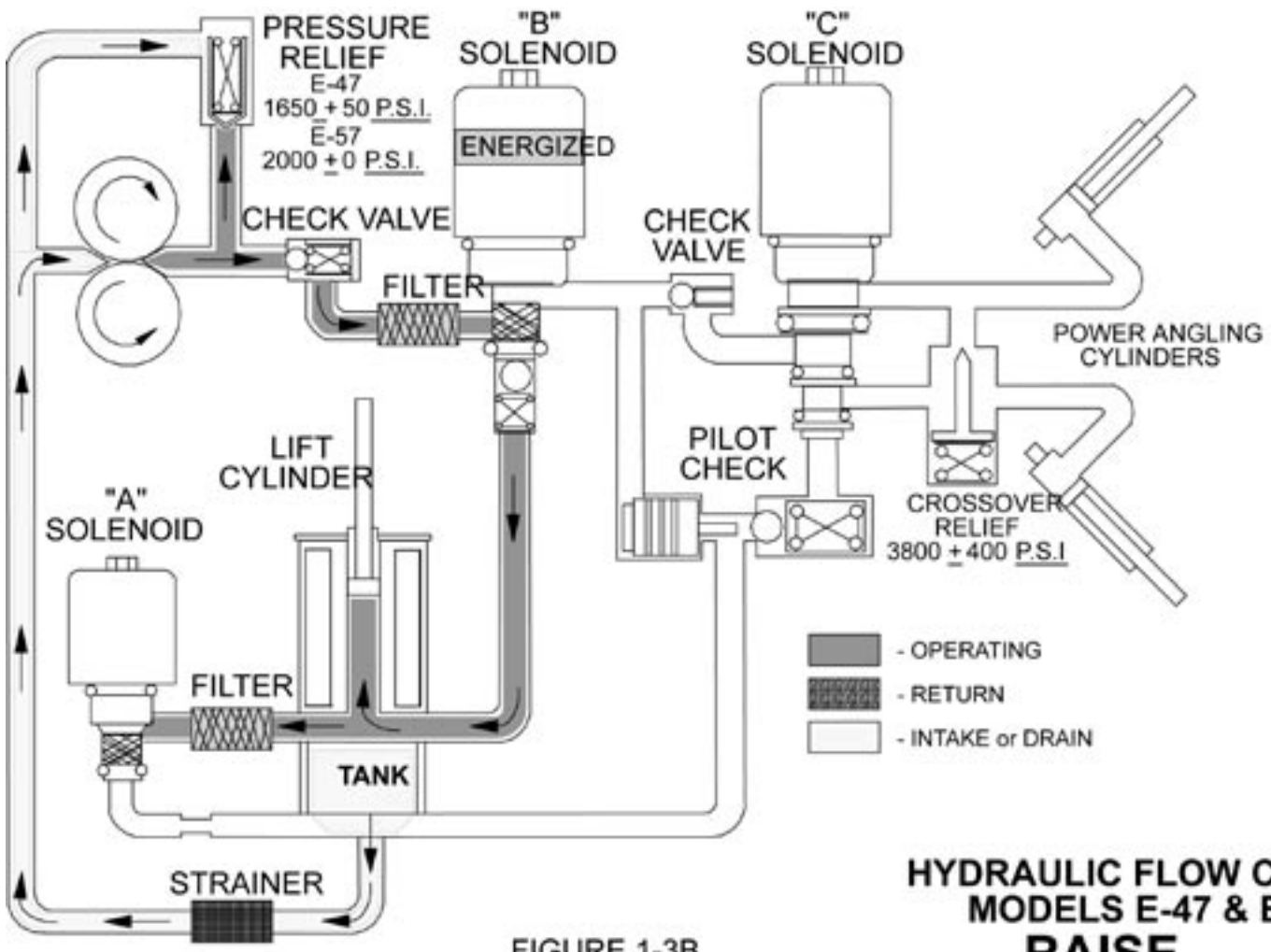
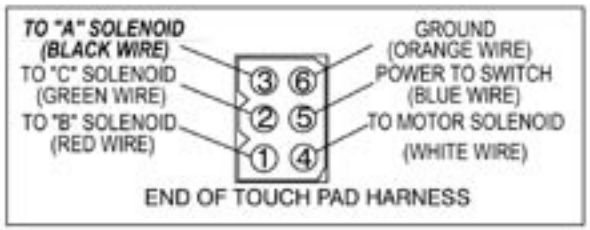


FIGURE 1-3B

HYDRAULIC FLOW CHART
MODELS E-47 & E-57
RAISE

ELECTRO -TOUCH CONTROLLER



LOWER/FLOAT

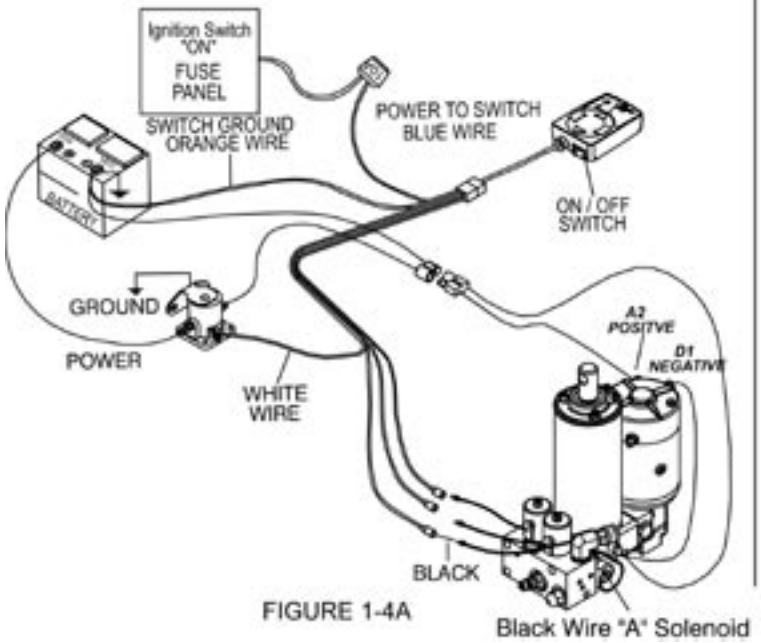


FIGURE 1-4A

SLIK - STIK SINGLE LEVER CONTROLLER

LOWER/FLOAT

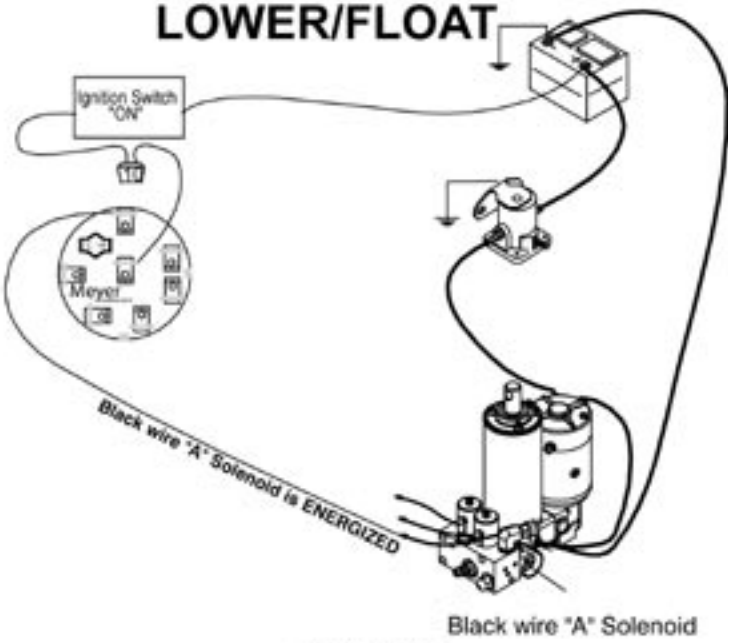


FIGURE 1-4A

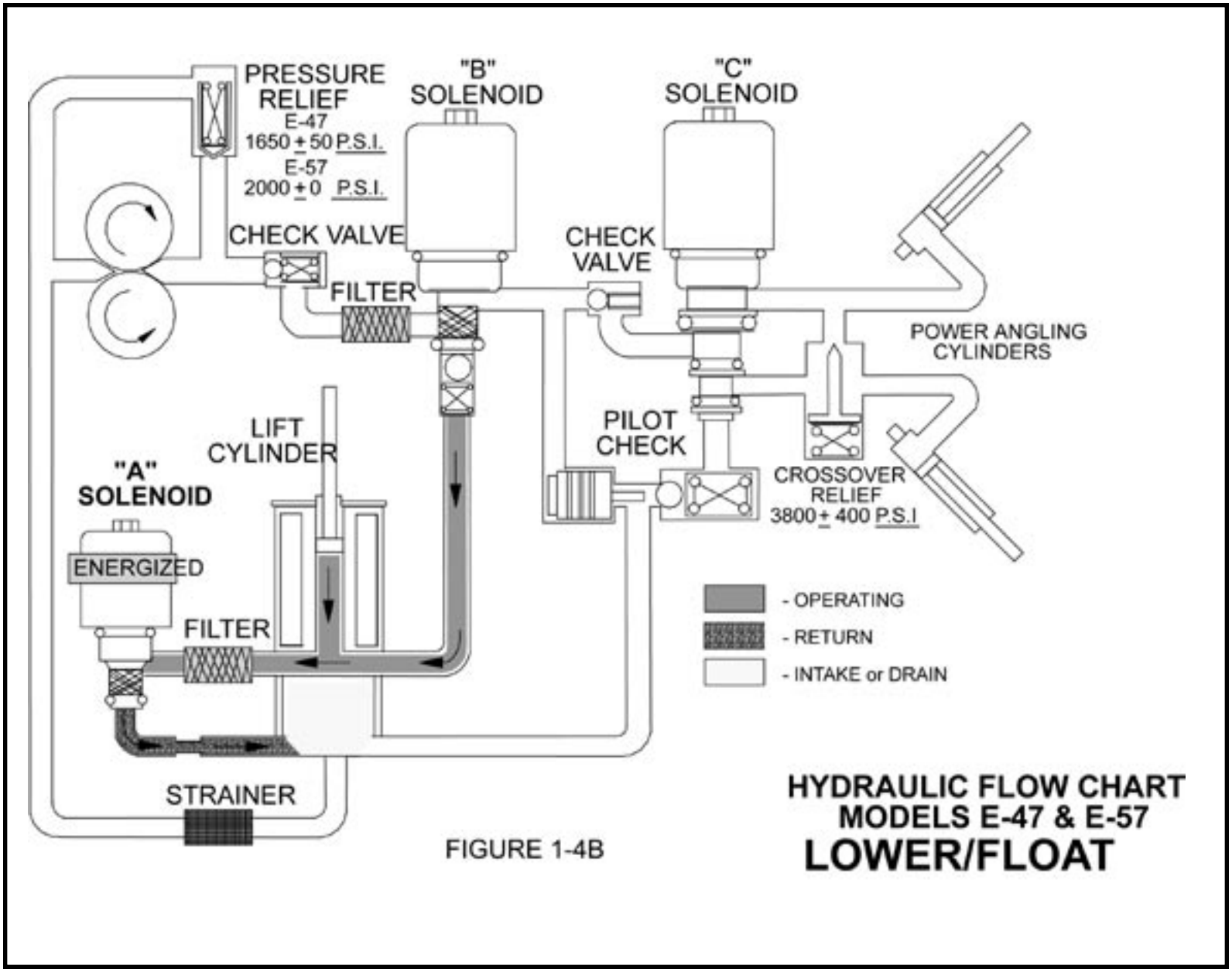
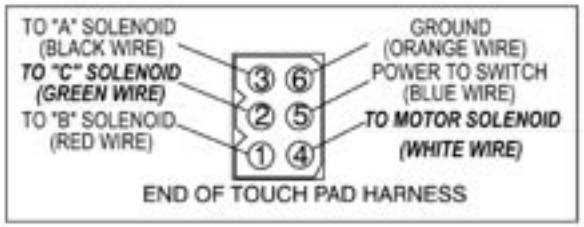


FIGURE 1-4B

HYDRAULIC FLOW CHART
MODELS E-47 & E-57
LOWER/FLOAT

ELECTRO -TOUCH CONTROLLER



RIGHT ANGLE

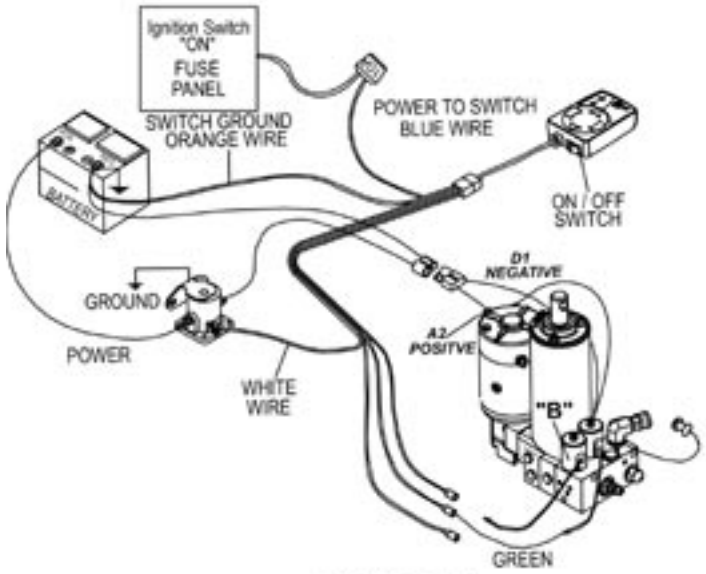


FIGURE 1-5A

SLIK - STIK SINGLE LEVER CONTROLLER

RIGHT ANGLE

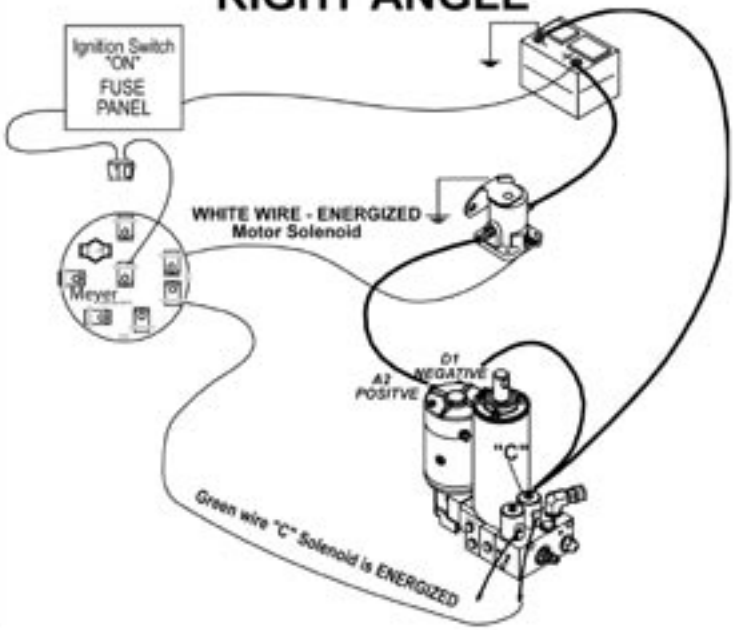


FIGURE 1-5A

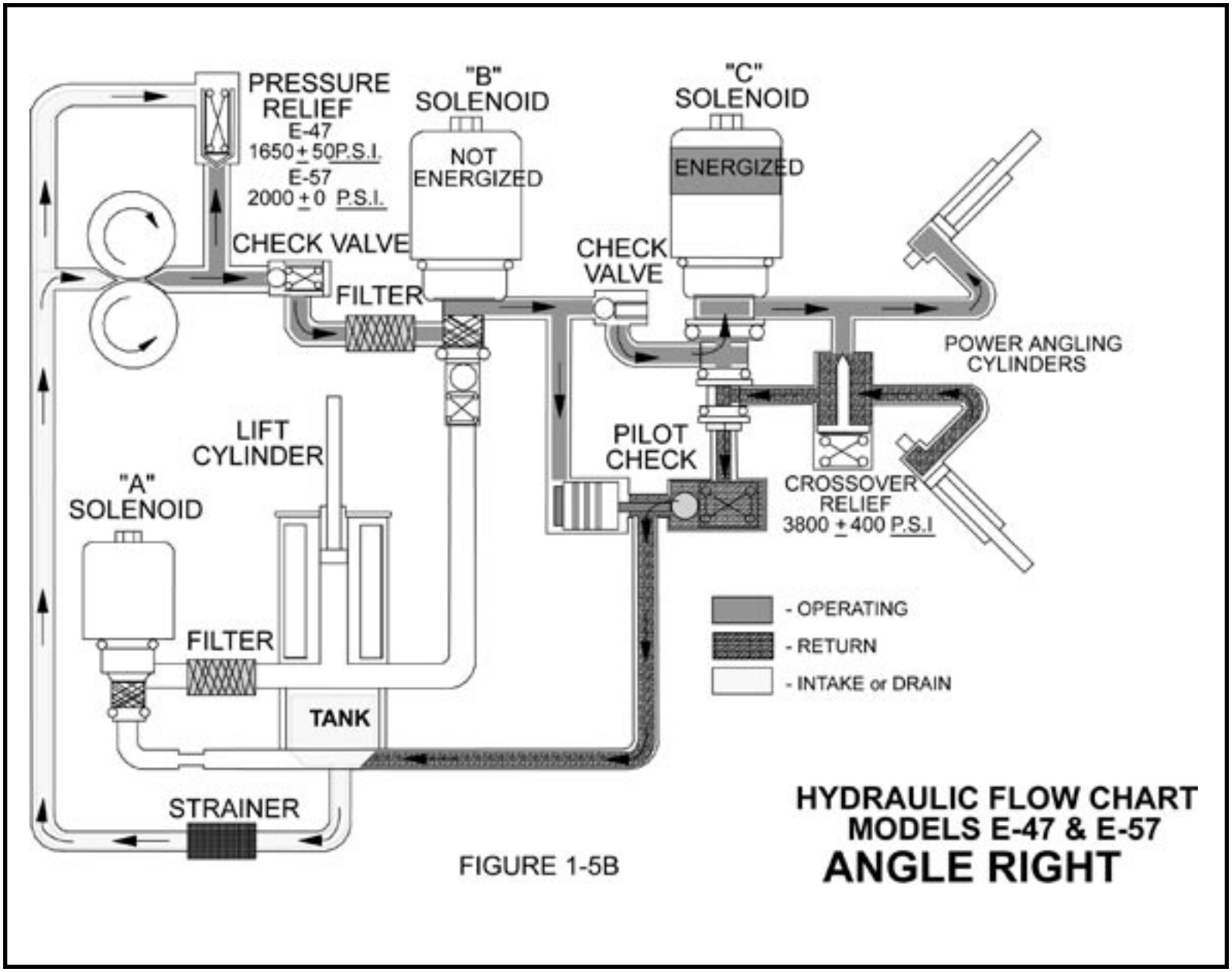
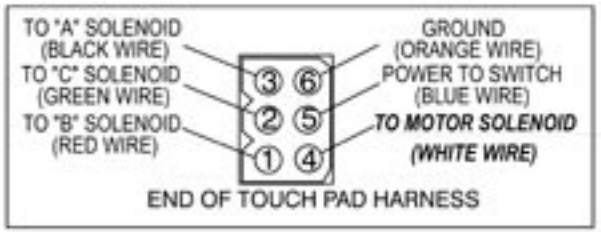


FIGURE 1-5B

HYDRAULIC FLOW CHART
MODELS E-47 & E-57
ANGLE RIGHT

ELECTRO -TOUCH CONTROLLER



LEFT ANGLE

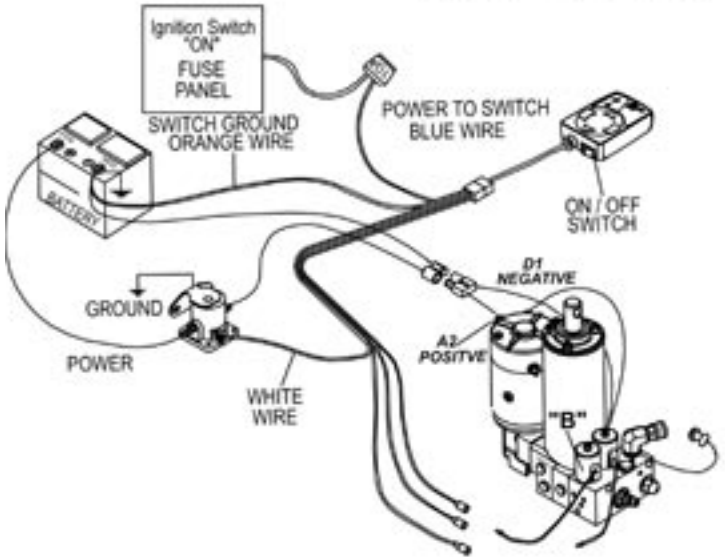


FIGURE 1-6A

SLIK - STIK SINGLE LEVER CONTROLLER

LEFT ANGLE

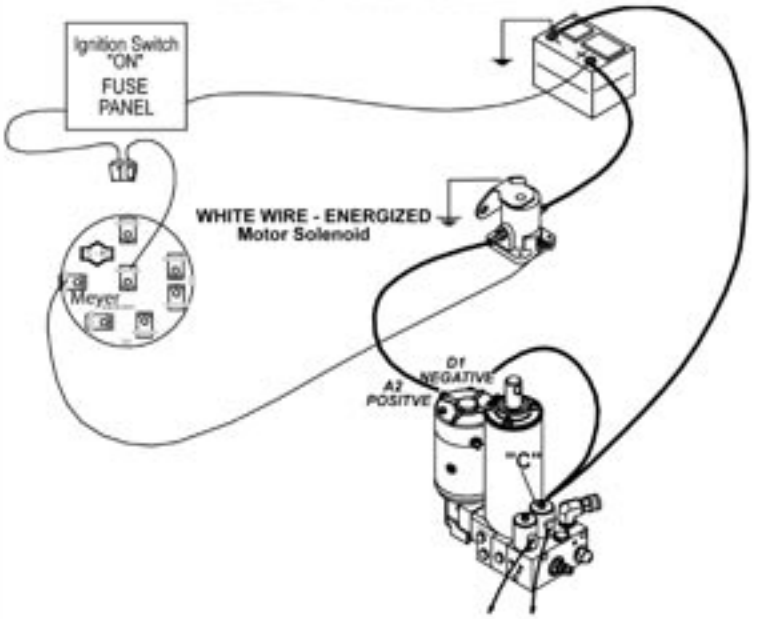


FIGURE 1-6A

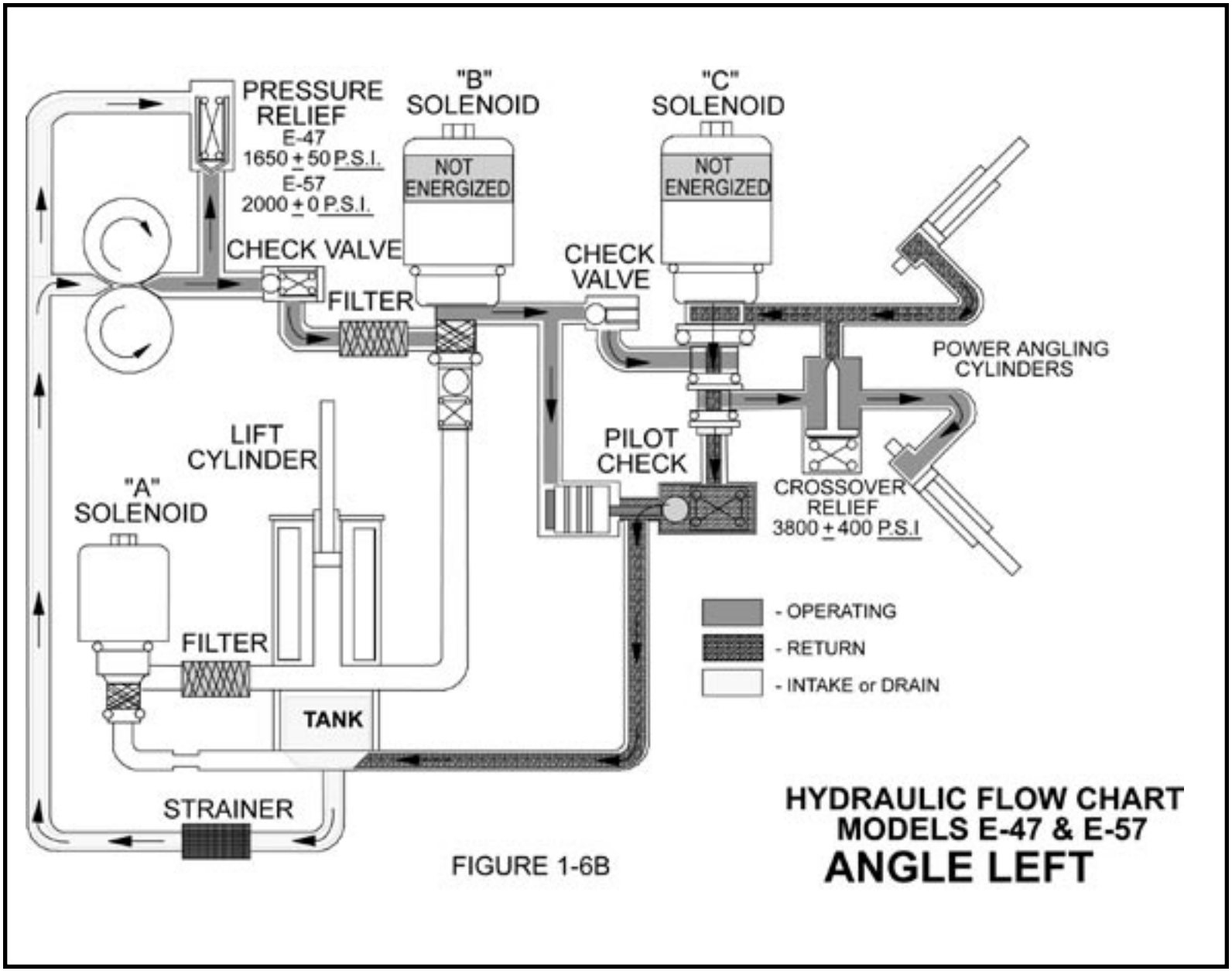
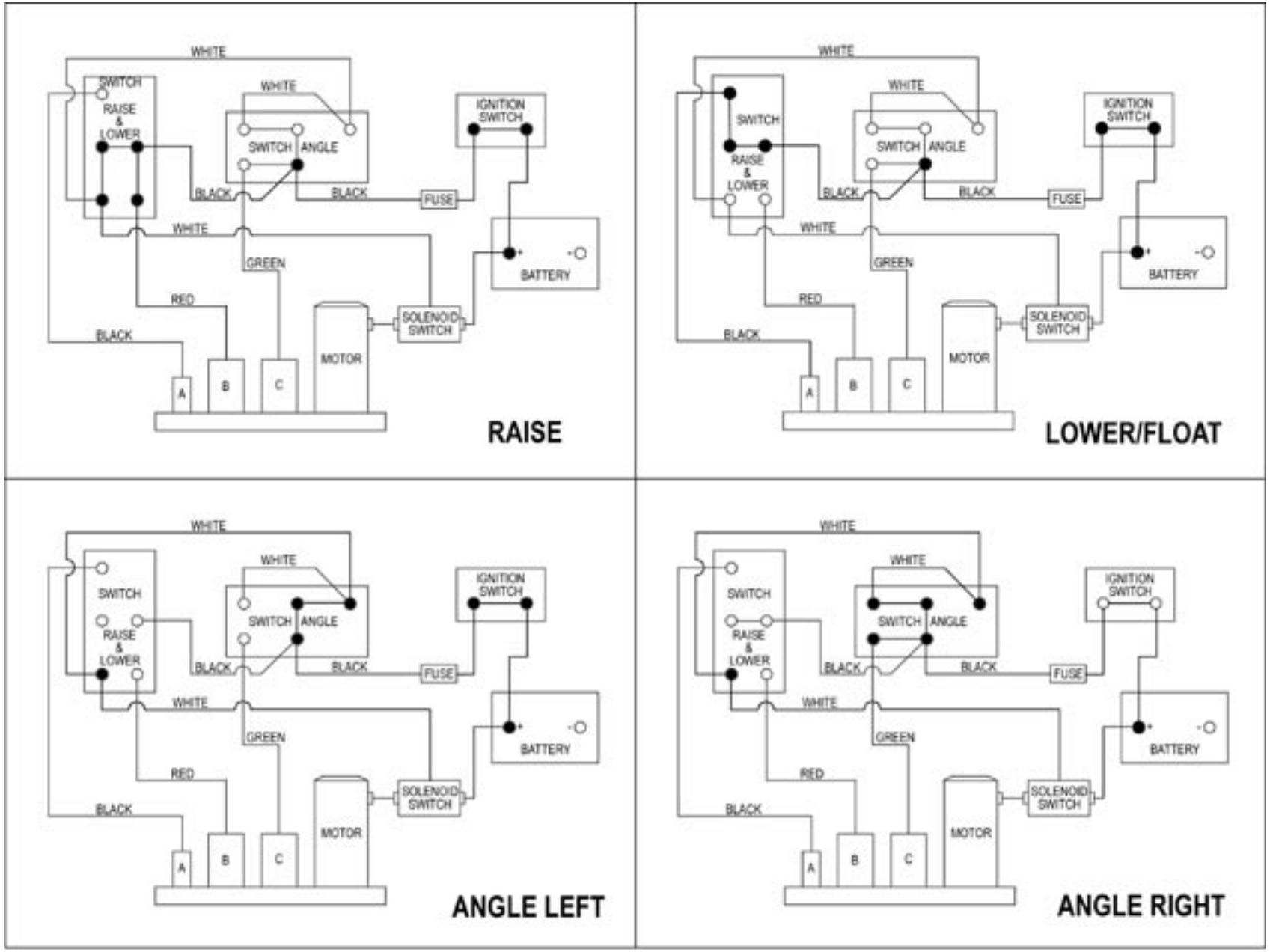


FIGURE 1-6B

HYDRAULIC FLOW CHART
MODELS E-47 & E-57
ANGLE LEFT



DUAL SWITCH WIRING

ELECTRO LIFT® UNIT COMPONENTS

MOTORS (3") E-46, E-46H and E-47, E-47H

The 12-volt DC high torque motor used on the Electro Lift® units are interchangeable among all four models. Its function in all four applications is to drive the hydraulic pump. The motor is only energized and operating when pressurized hydraulic fluid is required.

Two different brand motors were used. While they are interchangeable and have nearly identical performance characteristics, they have distinctive design differences.

American Bosch

The American Bosch motor is a four pole, permanent magnet motor which consists primarily of a 3" diameter solid steel frame, armature, brushes and ceramic permanent magnet fields. Because the fields are permanent magnets, they do not require electrical current to operate. Therefore, the motor requires lower amperage to produce a given amount of power.

Electro Lift® units equipped with an American Bosch motor cannot be used on vehicles with a positive ground electrical system since the motor will rotate backwards. Positive ground vehicles will require modification of the brush assembly.

Prestolite - (obsolete)

MOTOR (4-1/2") E-57, E-57H

Iskra - Single and Two terminal

The Iskra motor is a four pole, electromagnet motor which consists primarily of a 4-1/2" diameter solid steel frame, armature, brushes, field coils and pole pieces. This motor can be used on vehicles with either the common negative ground electrical system or the positive ground electrical system.

HYDRAULIC PUMP

The pump in a hydraulic system employs an external source of power to apply a force to a liquid. A pump develops no power of its own. It simply transfers power from an external source (the electric motor on the Electro Lift® unit) to the liquid in the hydraulic system.

The basic operating principles of the hydraulic pump used in the Electro Lift® units are quite simple. Figure 1-7 illustrates the basic components of a positive displacement gear type pump and their functions. The pumping action takes place within the pump chamber which is connected to the reservoir by the intake line. The pump chamber has an outlet line in which the liquid under motion and pressure leaves the pump to perform work.

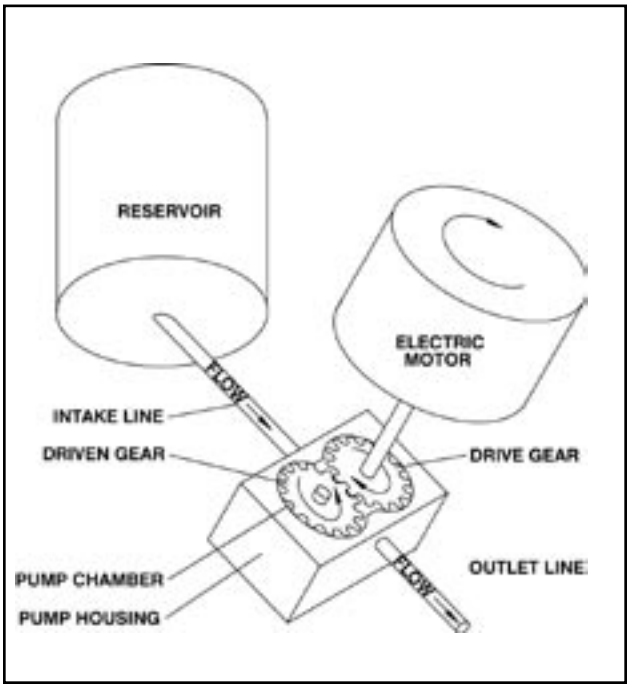


FIGURE 1-7

PRESSURE RELIEF VALVE

A basic pressure relief valve is shown in Figure 1-8. It consists of a poppet valve and a valve spring. Both are located in a passage which connects the inlet passage to the outlet passage. The poppet valve is normally held closed by the valve spring, sealing the connecting passage from the pressurized outlet passage. The poppet valve, being a piston, is exposed to the pressurized hydraulic fluid in the outlet passage. Whenever the hydraulic pressure against the poppet valve becomes greater than the pressure being exerted on the poppet valve from the opposite direction by the valve spring, the poppet valve will open. This allows some of the pressurized hydraulic fluid to flow through the connecting passage to the non pressurized inlet passage. The effect is to lower the pressure in the outlet passage which will allow the valve spring to close the poppet valve again.

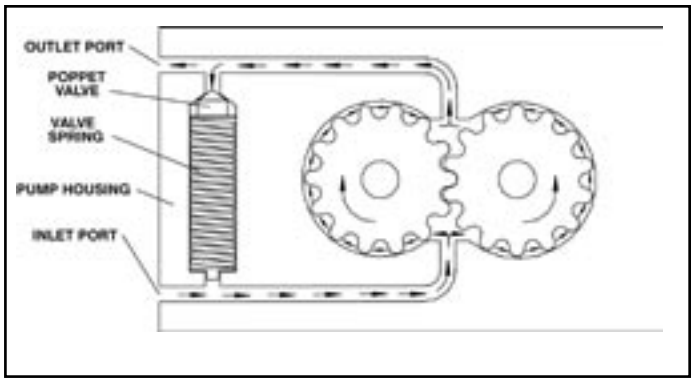


FIGURE 1-8

Under a condition, such as when a hydraulic cylinder is extended to the end of its stroke, eliminating additional space for the pressurized hydraulic oil to be pumped into, the alternate opening and closing of the poppet valve controls the pump's pressure output and provides an escape for the pressurized hydraulic fluid.

The pressure relief valve used in the Electro Lift® pump, while more sophisticated than the one described, functions in the same manner. The pump pressure relief valve may be adjusted on the E-46 & E-47 models to the specified pressure of 1650 P.S.I. by adjusting the set screw after installing a suitable pressure gauge of 2500 P.S.I. in the circuit. Note: The E-57 Model has a nonadjustable pressure relief valve and is factory set to 2000 P.S.I.

SOLENOID VALVES

Hydraulic valves are simple in concept and all have the same basic function: Control the direction of oil flow. One type of Solenoid Valve is used on the models E-46 and E-46H and three types are used on models that Power Angle.

Each Solenoid Valve consists of two components: the Cartridge and the Coil.

Cartridge

The Cartridge consists of the hydraulic valve mechanism and an armature which enables the valve mechanism to be operated and controlled electrically. The Cartridge is designed to screw in and out of the Electro Lift® units much like the typical "spark plug".

Coil

The Coil is the electrical component which operates the Cartridge's valve mechanism by producing magnetism which pulls the Cartridge's armature toward it. Since the armature is connected to the valve mechanism's only moving part, it is pulled by the armature.

Figure 1-9 illustrates the typical Coil. Whenever electrical current flows to the Coil, it flows through the winding, which consists of numerous turns of copper wire. The flow of current through the winding produces a magnetic field which pulls the soft iron armature further into the Coil.

The armature pulls the valve spool or poppet valve into its alternate (energized) position. Not illustrated is an integral coil spring, which is compressed when the armature is pulled by the magnetism.

When the current flow ceases, the magnetic field disappears and the compressed coil spring pushes the armature back to its original (de-energized) position.

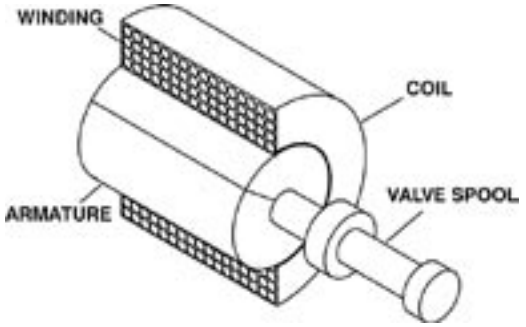


FIGURE 1-9

"A" Solenoid Valve

The "A" Solenoid Valve is used in all Models. The "A" Cartridge contains a poppet valve whose static or de-energized position is closed. Its energized position is open.

On all four models, the "A" Solenoid Valve retains hydraulic fluid in the lift cylinder. It is energized (opened) to allow the hydraulic fluid to flow from the lift cylinder back to the reservoir, enabling the plow to lower by gravity.

The "A" Solenoid Valve is designed to remain energized (open) while the plow is lowered, plowing snow. This is the "float" feature which insures that the plow maintains contact with the ground contour.

"B" Solenoid Valve

The "B" Solenoid Valve is used on the Power Angle Electro Lift® models. The "B" Cartridge contains a spool valve whose static (de-energized) position allows the pressurized hydraulic fluid to flow to the "C" Solenoid Valve. In the energized position, the pressurized hydraulic fluid is diverted to the lift cylinder, raising the plow.

"C" Solenoid Valve

The "C" Solenoid valve is used on the Power Angle Electro Lift® models. The "C" Cartridge contains a spool valve whose static (de-energized) position allows the pressurized hydraulic fluid to flow to the right power angling cylinder which angles the plow to the left. At the same time, it allows the hydraulic fluid being forced from the retracting left power angling cylinder to flow through the "C" Cartridge back to the reservoir.

In the energized position, the pressurized hydraulic fluid is diverted to the left power angling cylinder, angling the plow to the right. Also, the hydraulic fluid being forced from the retracting right power angling cylinder flows through the "C" Cartridge back to the reservoir.

CHECK VALVES

Check valves are very simple devices that have two basic functions: They prevent fluid from passing through them in one direction, but they allow fluid to pass through them in the opposite direction.

In all four Power Angling models a pump check valve is used to prevent hydraulic fluid from leaking back through the pump to the reservoir. Its function on the E-46 and E-46H models is more critical since it is the only means by which pressurized hydraulic fluid pumped into the lift cylinder is prevented from leaking out through the pump, causing the plow to slowly come down.

The E-47 and E-57 models incorporate two additional check valves, necessary because the "B" and "C" Solenoid Valves, being spool valves, have some leakage.

One check valve is located between the "B" Solenoid Valve and the lift cylinder. It prevents the hydraulic fluid in the lift cylinder from leaking back through the "B" Solenoid Valve which could cause the weight of the plow to angle the plow to the left by forcing hydraulic fluid through the "C" Solenoid Valve into the right power angling cylinder.

The other check valve is located between the "B" and "C" Solenoid Valves. It prevents the hydraulic fluid in either power angling cylinder from being forced through the "B" Solenoid Valve to the left cylinder.

PILOT CHECK VALVE

The pilot check valve is more sophisticated in that it incorporates a piston in addition to the ball, seat and spring. It is located between the "C" Solenoid Valve and reservoir. It has two functions: The first is to prevent the hydraulic fluid in either power angling cylinder from leaking back to the reservoir. The second is to allow the hydraulic fluid from the retracting power angling cylinder during the angling cycle to return to the reservoir. This is accomplished by the pressurized hydraulic fluid moving the piston which forces the check ball off its seat.

CROSSOVER RELIEF VALVE

When plowing snow, a snow plow can be exposed to damaging forces caused by impact with hidden obstructions, ends of curbs, etc. With power angling, these damaging forces can damage not only the snow plow but also the vehicle. The crossover relief valve has the function of protecting the snow plow system against these damaging forces under normal snow plowing conditions. The crossover relief valve, cannot protect the system from damaging forces that are too great due to abusive snow plowing conditions.

Basically, the crossover relief valve functions exactly like the previously described pump relief valve. It's designed to open at a specific pressure.

In this instance, the pressure is not produced by the pump but rather by the damaging force. As an example, assume that the right corner of the plow runs into the end of a curb. The impact will attempt to collapse the right power angling cylinder. As a result, very high hydraulic pressure is produced within the cylinder. When the produced pressure is high enough, it opens the crossover relief valve, allowing the highly pressurized hydraulic fluid to flow directly to the left power angling cylinder.

When the crossover relief valve functions in this manner, the excessive pressure is released, the excessive energy produced by the impact is absorbed, and the result is only a change in angled position of the plow.

The crossover relief valve may be adjusted to the specified pressure of 3800 P.S.I. ± 400 by turning the 3/8" hex cap screw after installing a suitable pressure gauge of 4000 P.S.I. in the circuit. TIGHTEN (TURN IN) ADJUSTMENT SCREW TO INCREASE PRESSURE. See Figure 3-63. Disassembly/ Reassembly figures 3-42 thru 3-62.

SWITCH (Models E-46 and E-46H)

A single three-position toggle switch is used on the E-46 and E-46H models. The positions are:

- Off (Center Position)
- Raise (Up Position)
- Lower and Float (Down Position)

In the "off" position, the switch conveys no current.

In the "raise" position, the switch conveys current to the solenoid switch. When released, an internal spring returns the toggle to the "off" position.

In the "lower and float" position, the switch conveys current to the "A" Solenoid Valve. When released, the toggle will stay in the "lower and float" position. The toggle must be manually returned to the "off" position.

SWITCHES (Power Angling Models)

Dual Switch Control

Two three-position toggle switches are used on the E-47 and E-47H models. The first, to raise and lower the plow, has the same positions as the toggle switch used on the E-46 and E-46 H models. However, because it functions differently, it is a completely different switch.

In the "off" position, the switch conveys no current.

In the "raise" position, the switch conveys current to the solenoid switch and the "B" Solenoid Valve. When released, an internal spring returns the toggle to the "off" position.

SWITCHES (Power Angling Models) Cont.

Dual Switch Control

The second toggle switch is to angle the plow. The positions are:

- Off (Center Position)
- Angle Left (Left Position)
- Angle Right (Right Position)

In the "off" position, the switch conveys no current.

In the "angle left" position, the switch conveys current to the solenoid switch. When released, an internal spring returns the toggle to the "off" position.

In the "angle right" position, the switch conveys current to the solenoid switch and to the "C" Solenoid Valve. When released, an internal spring returns the toggle to the "off" position.

Single Lever Control

A single lever control is also used on the Electro Lift® models. This switch (five-position) functions the same as the two three-position toggle switches previously discussed.

Electro-Touch® Control Pad

IMPORTANT:

The power lead to the switch should be connected to a terminal on the fuse panel that is HOT ONLY when the ignition switch is in the "ON" position.

When the control switch is powered up, yellow lights illuminate the arrows of the individual functions. The up arrow for raise, the left arrow for angle left, the right arrow for angle right and the down arrow for lower or float.

Holding the down arrow for a full second will activate a light located in the upper left corner of the Electro-Touch® switch. This light indicates the snow plow is now in the float position. In this position the snow plow will be able to follow the contour of the road and the snow plow can also be angled to the left or right. Touching the up arrow will automatically cancel the float position.

This switch is short circuit, open circuit and temperature protected. If any of these conditions exists, the overload light will illuminate. The overload light is located just below the float light in the upper left corner of the Touch Pad. Reset is accomplished by cycling the power to the Touch Pad via the on/off switch located to the left of the cord as it enters the Touch Pad.

CAUTION: When the snow plow is not in operation, the Electro-Touch® Control Switch should be in the "OFF" position.

SOLENOID SWITCH

The Electro Lift® motor requires more current or amperage to operate than the vehicle wiring, vehicle ignition switch or toggle switches have the capacity to handle. The solenoid switch is essentially a heavy duty switch with the capacity to handle the heavy current required by the motor. It is closed electrically by the solenoid to convey the heavy current directly from the vehicle battery via heavy gauge electrical cable. The solenoid, which functions essentially the same as the previously described solenoid valves, receives its low amperage current at the proper times via the wiring harness. This solenoid must be grounded to operate properly.

FILTERS

Cleanliness is perhaps the single most important ingredient in assuring a hydraulic system's reliability. Should the hydraulic fluid become contaminated, malfunction and permanent damage to the hydraulic system may occur. For this reason, all the Electro Lift® units are equipped with a filter system consisting of:

E-46	E-47, E-57	
E-46H	E-47H, E-57H	
X	X	A fine screen strainer on the reservoir pump inlet.
X	X	A filter screen between the lift cylinder and "A" Solenoid Valve.
	X	A high pressure filter on the pressure side of the pump.

With this system, the hydraulic fluid is filtered as it leaves the reservoir on its way to the pump and on the Power Angling units filtered again as it leaves the pump. Because clean hydraulic fluid is most important to insure "A" Solenoid Valve reliability, the hydraulic fluid leaving the lift cylinder is filtered before passing through the "A" Solenoid Valve. The filter screen and high pressure filter are easily removed for periodic cleaning or replacement.

NOTE: Additional filter screens are added to the "A", "B" and "C" Cartridge Valves.

IMPORTANT:

Should the hydraulic fluid become contaminated, it will be necessary to replace all the hydraulic oil in the system. The complete system (hydraulic unit, power angling cylinders and hoses) should be flushed. Flush the system with Meyer Hydra-Flush™ Fluid M-2.

SECTION 2 - DIAGNOSIS

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“CROSSOVER RELIEF VALVE” Flow Chart 29

DIAGNOSTIC FLOW CHART FOR E-46, E-47 and E-57 ELECTRO LIFT® UNITS

These charts are intended to be used as an aid in diagnosing problems on the Electro Lift® units. They are not a substitute for factory training and experience. Be certain to read the General Information and Testing Tips sections before attempting any troubleshooting.

General Information

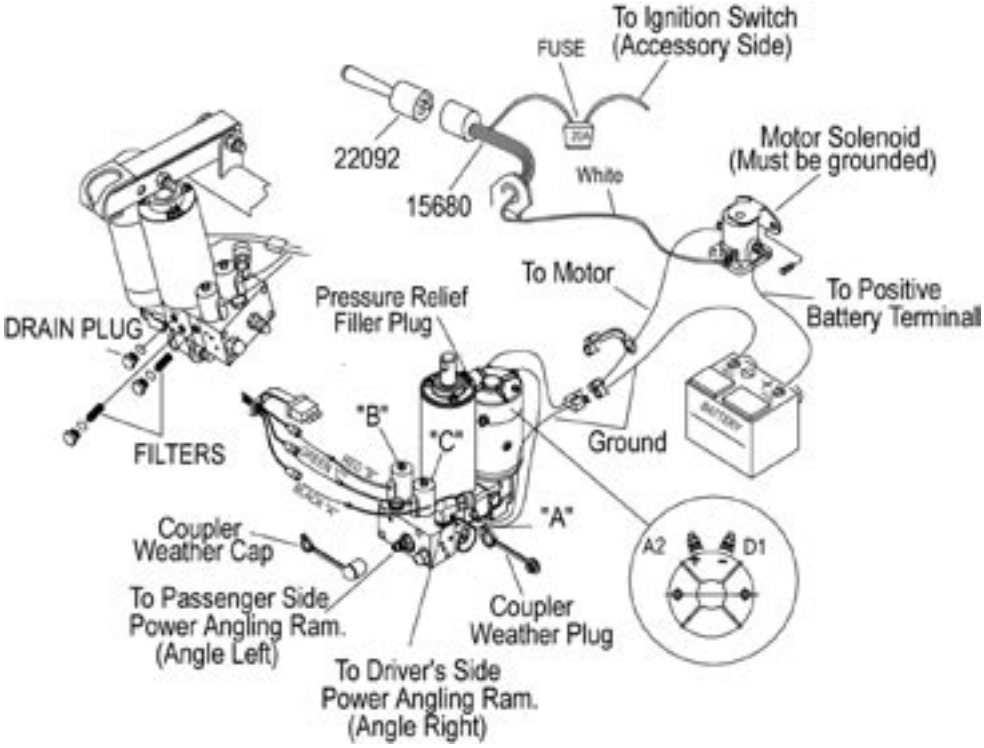
Before any troubleshooting is started, make certain the following conditions are met.

1. The moldboard is pointing straight ahead. This can often be done by coupling the left cylinder into the right cylinder and pushing the moldboard by hand.
2. The power angling cylinders must be installed correctly on to the A- frame. The left cylinder (Driver's side) has a hose attached with a male half of a coupler at the end; the right cylinder (Passenger side) has a hose attached with a female half of a coupler at the end.
3. The solenoid coils must be on their proper valve. The "C" coil (green wire) must be next to angling fittings. The "B" coil (red wire) is located to the front of the Electro Lift® Unit. The "A" coil (black wire) is smaller and is located on the back side of the unit. (See Drawing).

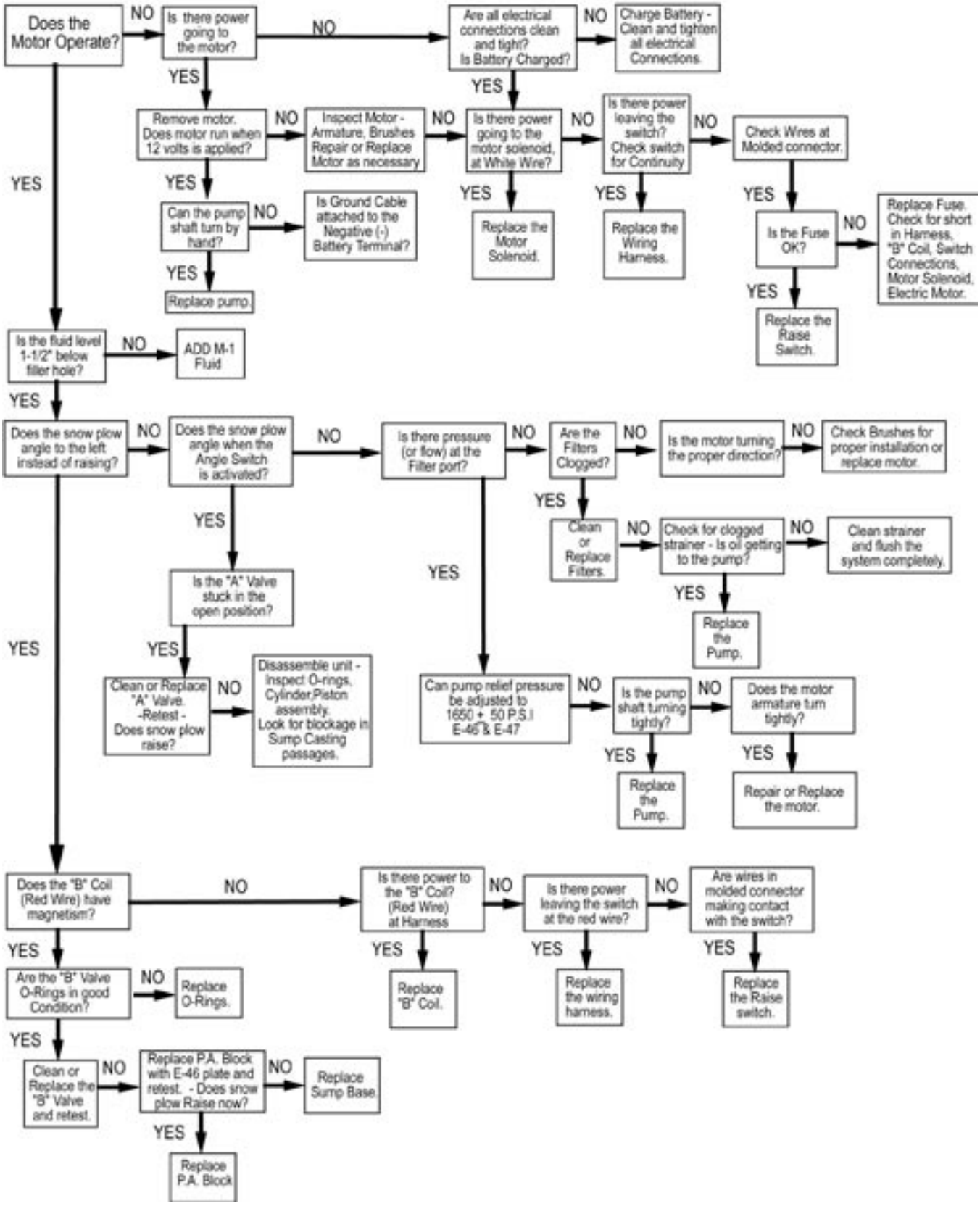
TESTING TIPS

Many tests do not require removing the Electro Lift® unit from the vehicle. However, more thorough testing can be performed using the Meyer Test Stand which allows direct pressure and amperage readings.

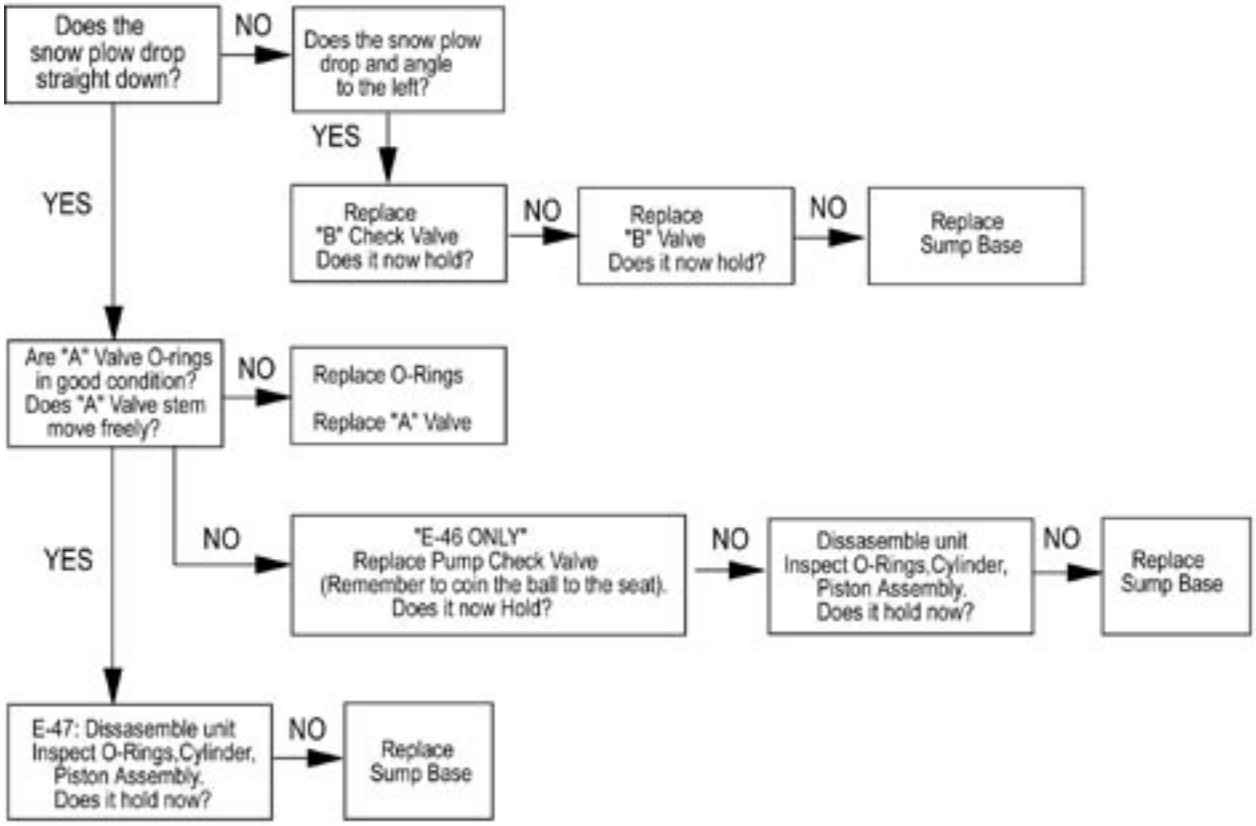
1. Using a screwdriver or other small tool to check for magnetism of the solenoid coils "A", "B", "C". Place the tool on the nut securing the coil and have an assistant operate the switch. You should feel strong magnetic attraction.
2. Use a test light or volt meter to determine whether there is power at the harness or switch. The current 22154 Electro-Touch Control has been redesigned. **Note:** The Electro-Touch Controller now has raised buttons and its circuitry has been changed from analog to digital, functions have not changed. For troubleshooting for power at the solenoids do not disconnect wires. To check for power, prick the wire through the insulation for testing. The control knows when a short or an open connection occurs and will go into overload mode for the function being activated. To reset the controller turn the switch on and off. The Electro-Touch Control will not operate if not wired properly. Controller must be grounded, Orange wire from switch harness attaches to the negative terminal of the battery. Reference Form 1-795 for wiring diagram.
3. When determining AMP draw of the motor, always obtain the highest value possible, i.e, at maximum raise or maximum angle with motor running.
4. Proper rotation for the 3" motor (American Bosch) is indicated by an arrow located on top side of the (Part # 15026) pump.
5. The pump shaft of a good pump can be turned smoothly using two fingers. If it can't be turn easily, the pump is too tight and must be replaced.
6. Pump pressure can be measured at an angle hose (note pressure at full angle) or in the pressure filter port (an adaptor is necessary for the filter port). Note: The E-57 Electro Lift® Unit has a non adjustable pressure relief valve.
7. Flush the complete system including unit, hoses and power angling rams with Meyer Hydra-Flush™ Fluid M-2.



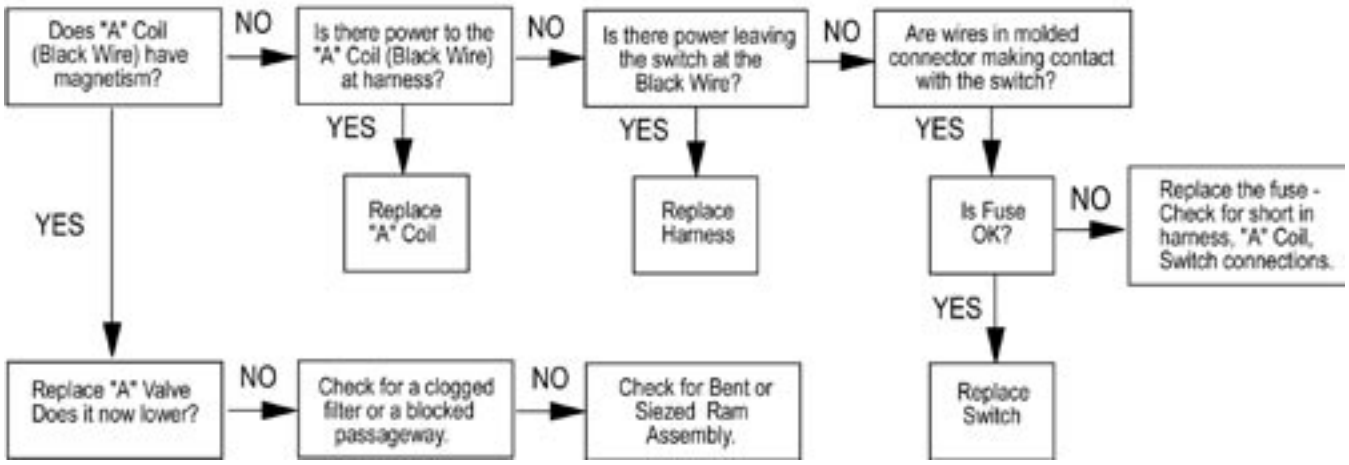
SNOW PLOW WILL NOT RAISE


Does the Motor Operate?
NO
Is there power going to the motor?
NO
Are all electrical connections clean and tight? Is Battery Charged?
NO
Charge Battery - Clean and tighten all electrical Connections.
YES
YES
Remove motor. Does motor run when 12 volts is applied?
NO
Inspect Motor - Armature, Brushes Repair or Replace Motor as necessary
NO
Is there power going to the motor solenoid, at White Wire?
NO
Is there power leaving the switch? Check switch for Continuity
NO
Check Wires at Molded connector.
YES
YES
YES
YES
YES
Can the pump shaft turn by hand?
NO
Is Ground Cable attached to the Negative (-) Battery Terminal?
Replace the Motor Solenoid.
Replace the Wiring Harness.
Is the Fuse OK?
NO
Replace Fuse. Check for short in Harness, "B" Coil, Switch Connections, Motor Solenoid, Electric Motor.
YES
YES
Replace pump.
YES
Replace the Raise Switch.
Is the fluid level 1-1/2" below filler hole?
NO
ADD M-1 Fluid
YES
Does the snow plow angle to the left instead of raising?
NO
Does the snow plow angle when the Angle Switch is activated?
NO
Is there pressure (or flow) at the Filter port?
NO
Are the Filters Clogged?
NO
Is the motor turning the proper direction?
NO
Check Brushes for proper installation or replace motor.
YES
YES
Clean or Replace Filters.
NO
Check for clogged strainer - Is oil getting to the pump?
NO
Clean strainer and flush the system completely.
YES
YES
Is the "A" Valve stuck in the open position?
YES
YES
YES
Replace the Pump.
YES
Clean or Replace "A" Valve. -Retest - Does snow plow raise?
NO
Disassemble unit - Inspect O-rings, Cylinder,Piston assembly. Look for blockage in Sump Casting passages.
Can pump relief pressure be adjusted to 1650 + 50 P.S.I E-46 & E-47
NO
Is the pump shaft turning tightly?
NO
Does the motor armature turn tightly?
YES
YES
Replace the Pump.
YES
Repair or Replace the motor.
Does the "B" Coil (Red Wire) have magnetism?
NO
Is there power to the "B" Coil? (Red Wire) at Harness
NO
Is there power leaving the switch at the red wire?
NO
Are wires in molded connector making contact with the switch?
YES
YES
YES
YES
Are the "B" Valve O-Rings in good Condition?
NO
Replace O-Rings.
Replace "B" Coil.
Replace the wiring harness.
Replace the Raise switch.
YES
Clean or Replace the "B" Valve and retest.
NO
Replace P.A. Block with E-46 plate and retest. - Does snow plow Raise now?
NO
Replace Sump Base.
YES
Replace P.A. Block

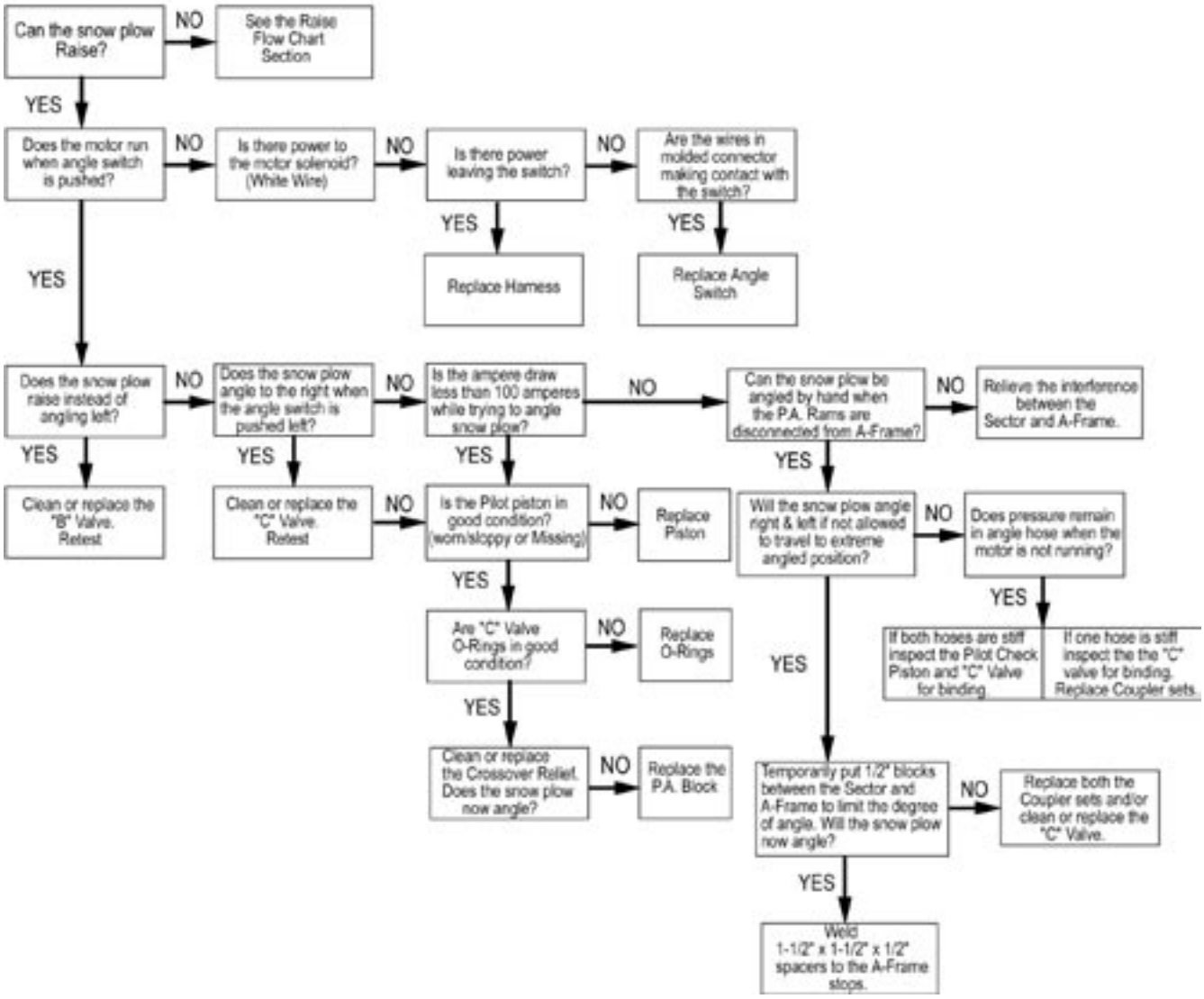
SNOW PLOW LEAKS DOWN


Does the snow plow drop straight down?
NO
Does the snow plow drop and angle to the left?
YES
YES
Replace "B" Check Valve Does it now hold?
NO
Replace "B" Valve Does it now hold?
NO
Replace Sump Base
Are "A" Valve O-rings in good condition? Does "A" Valve stem move freely?
NO
Replace O-Rings
Replace "A" Valve
YES
NO
"E-46 ONLY" Replace Pump Check Valve (Remember to coin the ball to the seat). Does it now Hold?
NO
Dissasemble unit Inspect O-Rings,Cylinder, Piston Assembly. Does it hold now?
NO
Replace Sump Base
E-47: Dissasemble unit Inspect O-Rings,Cylinder, Piston Assembly. Does it hold now?
NO
Replace Sump Base

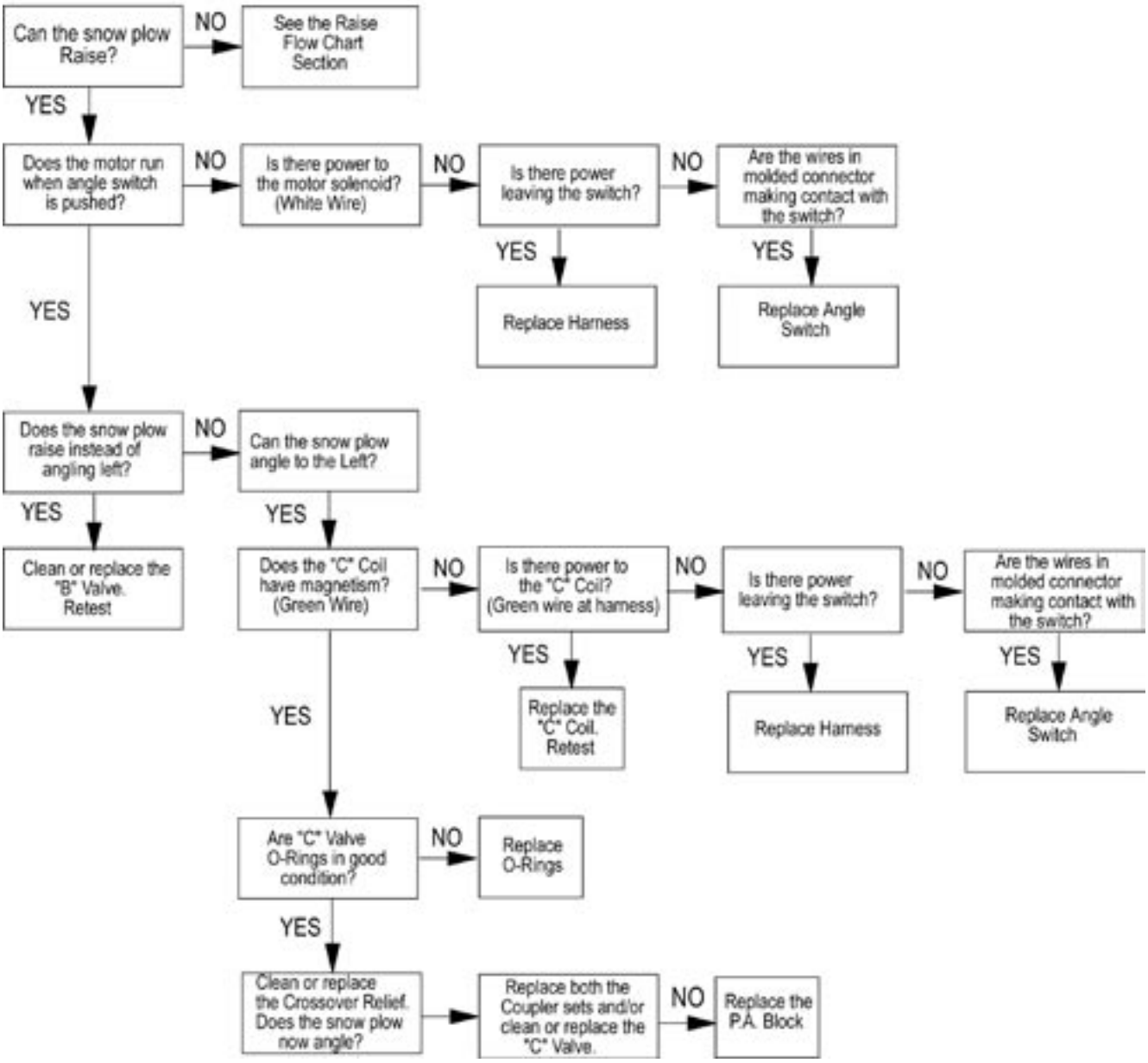
SNOW PLOW WILL NOT LOWER


Does "A" Coil (Black Wire) have magnetism?
NO
Is there power to the "A" Coil (Black Wire) at harness?
NO
Is there power leaving the switch at the Black Wire?
NO
Are wires in molded connector making contact with the switch?
YES
YES
YES
YES
Replace "A" Coil
Replace Harness
Is Fuse OK?
NO
Replace the fuse - Check for short in harness, "A" Coil, Switch connections.
YES
Replace Switch
Replace "A" Valve Does it now lower?
NO
Check for a clogged filter or a blocked passageway.
NO
Check for Bent or Siezed Ram Assembly.

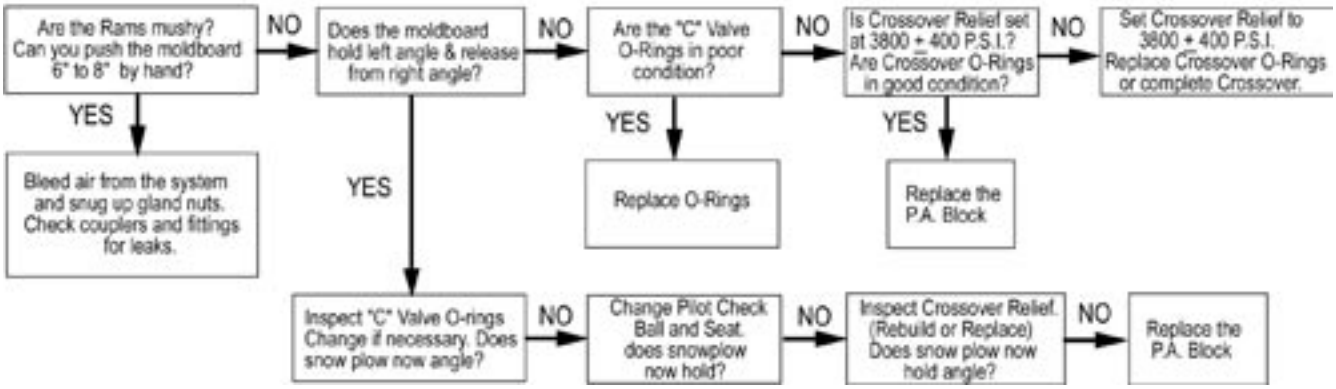
SNOW PLOW WILL NOT ANGLE LEFT


Can the snow plow Raise?
NO
See the Raise Flow Chart Section
YES
Does the motor run when angle switch is pushed?
NO
Is there power to the motor solenoid? (White Wire)
NO
Is there power leaving the switch?
NO
Are the wires in molded connector making contact with the switch?
YES
Replace Harness
YES
Replace Angle Switch
YES
Does the snow plow raise instead of angling left?
NO
Does the snow plow angle to the right when the angle switch is pushed left?
NO
Is the ampere draw less than 100 amperes while trying to angle snow plow?
NO
Can the snow plow be angled by hand when the P.A. Rams are disconnected from A-Frame?
NO
Relieve the interference between the Sector and A-Frame.
YES
Clean or replace the "B" Valve. Retest
YES
Clean or replace the "C" Valve. Retest
NO
Is the Pilot piston in good condition? (worn/sloppy or Missing)
NO
Replace Piston
YES
Will the snow plow angle right & left if not allowed to travel to extreme angled position?
NO
Does pressure remain in angle hose when the motor is not running?
YES
Are "C" Valve O-Rings in good condition?
NO
Replace O-Rings
YES
If both hoses are stiff inspect the Pilot Check Piston and "C" Valve for binding.
If one hose is stiff inspect the the "C" valve for binding. Replace Coupler sets.
YES
YES
Clean or replace the Crossover Relief. Does the snow plow now angle?
NO
Replace the P.A. Block
Temporarily put 1/2" blocks between the Sector and A-Frame to limit the degree of angle. Will the snow plow now angle?
NO
Replace both the Coupler sets and/or clean or replace the "C" Valve.
YES
Weld 1-1/2" x 1-1/2" x 1/2" spacers to the A-Frame stops.

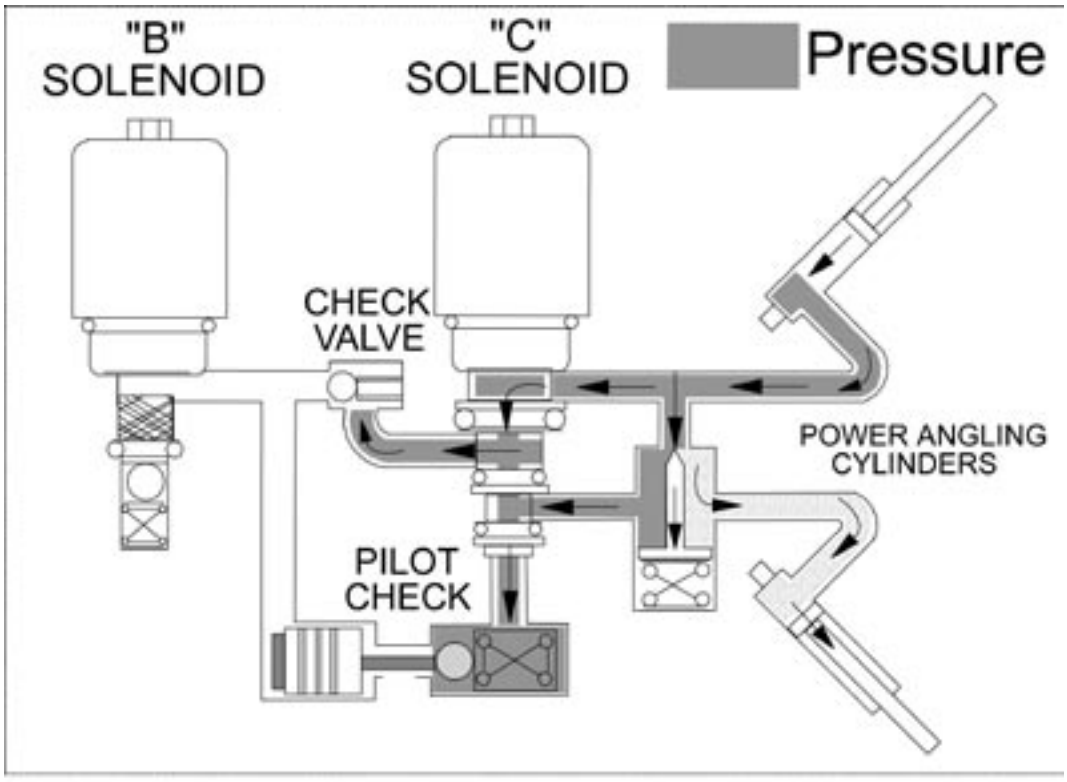
SNOW PLOW WILL NOT ANGLE RIGHT


Can the snow plow Raise?
NO
See the Raise Flow Chart Section
YES
Does the motor run when angle switch is pushed?
NO
Is there power to the motor solenoid? (White Wire)
NO
Is there power leaving the switch?
NO
Are the wires in molded connector making contact with the switch?
YES
Replace Harness
YES
Replace Angle Switch
YES
Does the snow plow raise instead of angling left?
NO
Can the snow plow angle to the Left?
YES
Clean or replace the "B" Valve. Retest
YES
Does the "C" Coil have magnetism? (Green Wire)
NO
Is there power to the "C" Coil? (Green wire at harness)
NO
Is there power leaving the switch?
NO
Are the wires in molded connector making contact with the switch?
YES
Replace the "C" Coil. Retest
YES
Replace Harness
YES
Replace Angle Switch
YES
Are "C" Valve O-Rings in good condition?
NO
Replace O-Rings
YES
Clean or replace the Crossover Relief. Does the snow plow now angle?
Replace both the Coupler sets and/or clean or replace the "C" Valve.
NO
Replace the P.A. Block

SNOW PLOW WILL NOT HOLD ANGLE


Are the Rams mushy? Can you push the moldboard 6" to 8" by hand?
NO
Does the moldboard hold left angle & release from right angle?
NO
Are the "C" Valve O-Rings in poor condition?
NO
Is Crossover Relief set at 3800 + 400 P.S.I.? Are Crossover O-Rings in good condition?
NO
Set Crossover Relief to 3800 + 400 P.S.I. Replace Crossover O-Rings or complete Crossover.
YES
Bleed air from the system and snug up gland nuts. Check couplers and fittings for leaks.
YES
Replace O-Rings
YES
Replace the P.A. Block
YES
Inspect "C" Valve O-rings Change if necessary. Does snow plow now angle?
NO
Change Pilot Check Ball and Seat. does snowplow now hold?
NO
Inspect Crossover Relief. (Rebuild or Replace) Does snow plow now hold angle?
NO
Replace the P.A. Block

Crossover Relief Valve



CROSSOVER RELIEF 3800 ± 400 P.S.I

SECTION 3 - REPAIR PROCEDURES

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GENERAL INFORMATION

Using the proper guidelines and precautions, all four model Electro Lift® units are easy to disassemble and reassemble. Figure 3-1 (page 32) is an exploded view which applies to all four models. It should be used as the primary reference for proper reassembly. Where necessary, this section includes additional information, photographs and illustrations to assure proper and efficient repairs.

UNIT DISASSEMBLY AND REASSEMBLY

Model E-46, E-46H, and Power Angling units with the exception of the Power Angling Valve Assembly, the parts and disassembly / reassembly procedures are common to all models.

Many repair procedures, including removal and replacement of the "B" and "C" Solenoid Valves, can be accomplished without removing the unit from the vehicle. While Figures 3-2 through 3-62 show the unit clamped in a vise, make all possible repairs on the vehicle when possible.

NOTE: Pump Assembly should not be disassembled since it cannot be serviced with the exception of the pressure relief valve (pages 19-20) and pump shaft seal which is covered separately in this section.

Motor should be taken to the appropriate (American Bosch or Prestolite) authorized service station in your area for all parts and service with the exception of brush replacement. Procedure for American Bosch motor brush replacement is covered separately in this section.

Disassembly

See Figures 3-2 through 3-11 (pages 34-36), Figures 3-25 through 3-31 (pages 39-41) for important disassembly points on any of the four models.
See Figure 3-12 (page 36) for important disassembly points on the E-46 and E-46H models.

See Figures 3-13 through 3-24 (pages 36-39) for important disassembly points on the Electro Lift® units.

See Figures 3-42 through 3-48 (Pages 44-45) for Crossover Relief disassembly.

Reassembly

See Figures 3-31 through 3-41 (pages 41-43) for important reassembly points on any of the four models.

See Figures 3-49 through 3-62 (Pages 46-49) for Crossover Relief reassembly.

Additional Reassembly Points

O-Rings- Coat liberally with hydraulic fluid and position carefully to minimize possibility of damage during assembly.

Fasteners- Torque all fasteners which are specified to insure proper reliability and prevent damage due to over-tightening.

PUMP

Shaft Seal Replacement

NOTE: Do not disassemble pump assembly.

1. Remove motor as shown in Figures 3-4 and 3-5 (page 34).

2. Using an appropriate tool, pry out the original shaft seal, being careful not to damage the shaft or pump housing.

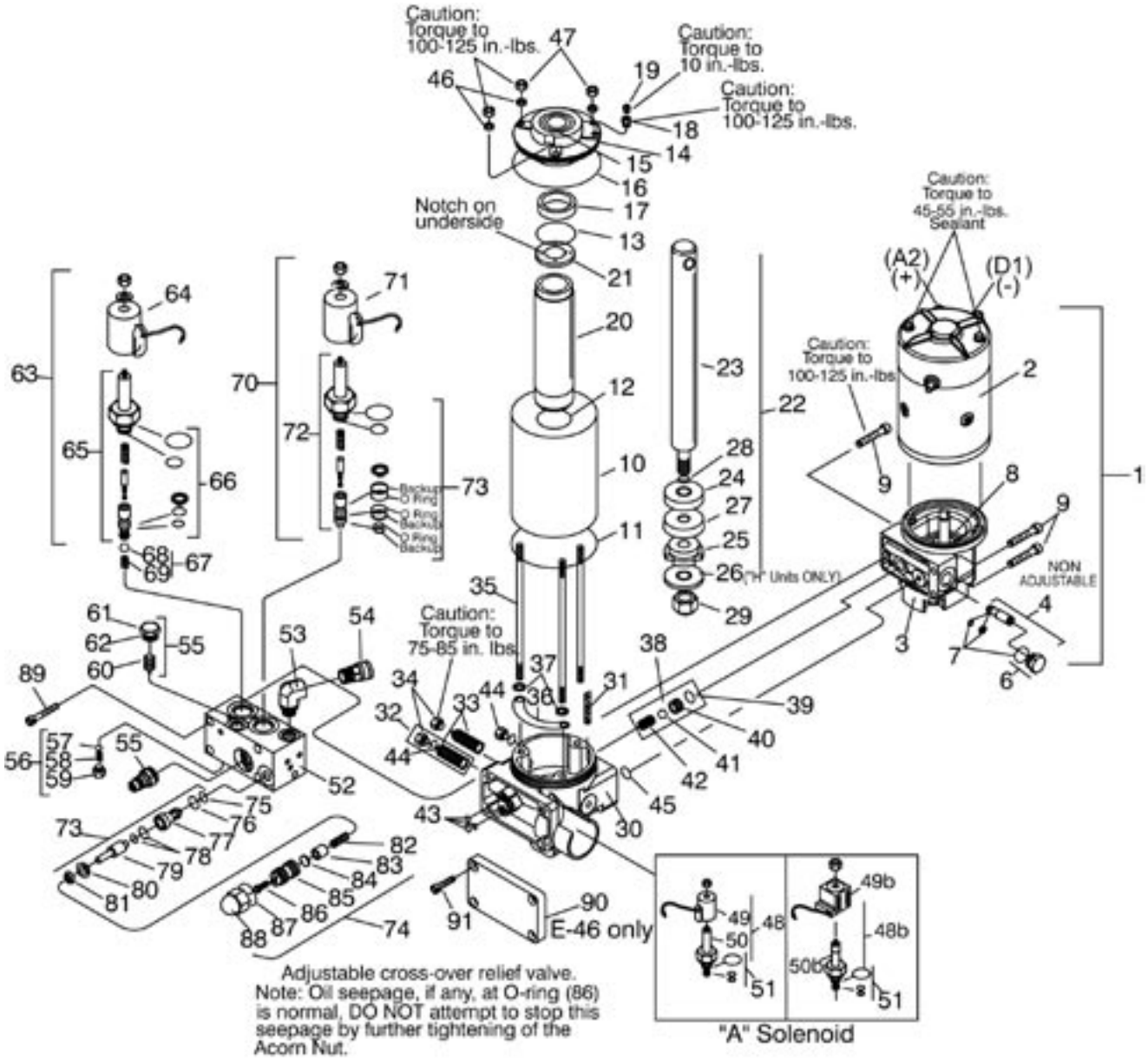
3. Liberally coat the replacement seal I.D. with hydraulic fluid and apply a very light film of Permatex Form-A-Gasket No. 2 or equivalent to the replacement seal O.D.

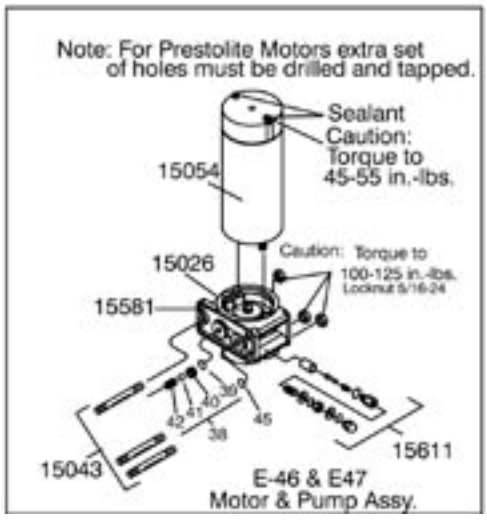
4. Carefully slide the replacement seal (metal side up) over the shaft until it is squarely against the pump housing.

5. Center a 11/16" hex deep socket over the seal and use it and a plastic or leather mallet to squarely drive the seal into the pump.

6. Replace the motor as shown in Figures 3-39 through 3-40 (page 43).

ELECTRO LIFT®
Exploded View


Caution: Torque to 100-125 in.-lbs.
Caution: Torque to 10 in.-lbs.
Caution: Torque to 100-125 in.-lbs.
Notch on underside
Caution: Torque to 45-55 in.-lbs. Sealant
(A2) (+)
(D1) (-)
Caution: Torque to 100-125 in.-lbs
Caution: Torque to 75-85 in. lbs.
(*H" Units ONLY)
NON ADJUSTABLE
E-46 only
Adjustable cross-over relief valve.
Note: Oil seepage, if any, at O-ring (86) is normal, DO NOT attempt to stop this seepage by further tightening of the Acorn Nut.
"A" Solenoid



PARTS BREAKDOWN
E-46, E-47 & E-47H
E-57 & E-57H
ELECTRO-LIFT®

PARTS LIST

ITEM	STANDARD-UP THROUGH C-9 1-1/8" x 6" Stroke E-57	LONG STROKE-HM-9 & HM-10 ONLY 1-1/8" x 8" Stroke E-57H	QTY.	DESCRIPTION
	15865	**15866**	**1**	**Lift Ass'y. (Unit only) 12 volt**
	15881	**15885**	**1**	**Lift Ass'y. (Unit only) 24 volt**
1	15869	15869	1	**Pump & Motor Assy. (12 volt)**
1b	15890	15890	1	**Pump & Motor Assy. (24 volt)**
2a	15727	15727	1	• Motor - 12 Volt (2 Terminal)
2b	15891	15891	1	• Motor - 24 Volt (2 Terminal)
3	15889	15889	1	• Pump Assy.
4	15874	15874	1	••Kit - Pump Relief Valve
5	15870	15870	1	•• Relief Valve Assy.
6	15878	15878	1	•• Plug w/O-Ring
7*	15875	15875	1	Seal Kit Relief Valve
8	15877	15877	1	Pump Shaft Seal
9	22339	22339	3	Soc. Head 5/16-18 x 1-3/4"
10	15045	15204	1	Cylinder Tank
11*	15131	15131	1	O-Ring 3-1/2 I.D.
12*	15163	15163	1	O-Ring 1-15/16 I.D.
13*	15198	15198	1	O-Ring 1-1/8 I.D.
14	15194	15194	1	**Cover & Seal Assy.**
15*	05119	05119	1	• Wiper
16*	15131	15131	1	• O-Ring 3-1/2 I.D.
17	15199	15199	1	• Sleeve
	08473	08473	1	**Pressure Relief Valve Kit**
18	21805	21805	1	• Reducer Bushing 1/4 x 1/8
19	21806	21806	1	• Pressure Relief Valve
20	15207	15205	1	Cylinder
21	15209	15209	1	Washer (Grooves Down)
22	15335	15761	1	**Ram Assembly**
23	15208	15206	1	• Ram
24	15158	15158	1	• Piston
25	15219	15219	1	• Piston Follower
26	15760	15760	1	• Spacer
27*	15162	15162	1	• Packing Cup
28*	15125	15125	1	• O-Ring 7/16 I.D.
29	20316	20316	1	• Locknut 1/2-13
30	15573	15573	1	**Base & Strainer Assy.**
31	15326	15326	1	• Strainer
32	15641	15641	2	**• Filter Kit - 9/16"**
33	15619	15619	1	•• Filter
34	21999	21999	1	•• Plug w/O-Ring - 9/16"
35	15042	15203	3	Stud
36	15621	15621	1	Baffle
37	21980	21980	2	Retainer Ring
38	15574	15574	1	**Pump Check Valve Kit**
39*	15124	15124	1	• O-Ring 3/8 I.D.
40			1	• Seat
41			1	• Ball, 9/32
42			1	• Spring
43*	15122	15122	3	O-Ring 1/4 I.D.
44	21999	21999	1	**Drain Plug w/O-Ring - 9/16"**
45*	15127	15127	1	O-Ring 5/8 I.D.
46*	21929	21929	3	Washer, Nyltite 5/16
47	20697	20697	3	Locknut 5/16 - 24
48	15972	15972	1	**"A" Solenoid Assembly**
49	15905	15905	1	•• "A" Coil, Black Wire (12V)
50	15660	15660	1	•• "A" Cartridge Valve
51*	15431	15431	1	••• Seal Kit, "A" Valve
48b	15661	15661	1	**"A" Solenoid Assembly**
49b	15659	15659	1	•• "A" Coil, Black Wire Plastic
	15662	15662	1	•• "A" Coil, Black Wire (24V)
50a	15660	15660	1	•• "A" Cartridge Valve
51b*	15431	15431	1	••• Seal Kit, "A" Valve
52	15758	15758	1	**• Valve Assy. w/Coup. (12V)**
	15779	15779	1	**• Valve Assy. w/Coup. (24V)**
53	22295	22295	1	• Forged 90 Degree Elbow
54	22294	22294	1	• Coupler, Female Half
55	22293	22293	1	• Coupler, Male Half
56	15639	15639	1	**• Kit-Pilot Check Valve**
57			1	•• Ball, Steel
58			1	•• Spring
59			1	•• Plug
60	15609	15609	1	• Piston
61	15359	15359	1	**• Plug Valve Block**
62*	15126	15126	1	•• O-ring 9/16 I.D.
63	15697	15697	1	**• "B" Solenoid Assembly**
64	15382	15382	1	•• "B" Coil, Red Wire
	15444	15444	1	•• "B" Coil, Red Wire (24V)
65	15698	15698	1	•• "B" Cartridge Valve
66*	15432	15432	1	•• Seal Kit-"B" Cartridge
67	15576	15576	1	**• Kit- "B" Check Valve**
68			1	•• Ball, 7/16
69			1	•• Spring
70	15358	15358	1	**• "C" Solenoid Assembly**
71	15430	15430	1	•• "C" Coil, Green Wire
	15445	15445	1	•• "C" Coil, Green Wire (24V)
72	15381	15381	1	•• "C"-Cartridge Valve
73*	15433	15433	1	•• Seal Kit-"C" Cartridge
74	15606	15606	1	**• Kit-Crossover Valve**
*	15610	15610	1	•• Seal Kit-Crossover Valve (includes items A,B,D,M)
75	21826	21826	4	Soc. Head 5/16-18 x 1-1/2"

Parts indented are included in assembly under which they are indented.

*** Parts included in Master Seal Kit Part No. 15888**
Basic Seal Kit Part No. 15254
Pump Relief Valve @ 2000 P.S.I. full flow. **Non Adjustable**
Set Crossover Relief Valve @ 3800 ± 400 P.S.I. @ 2-1/2 G.P.M.

DISASSEMBLY - ALL MODELS

FIGURE 3-2
To drain oil from the unit, remove the drain plug using a 11/16” wrench.

FIGURE 3-3
Drain Plug removed.

FIGURE 3-4
To replace the motor remove the two cap screws, use a 10mm hex socket on the E-57 and a 3/8” hex socket on the E-46 and E-47.

FIGURE 3-5
Hold the motor parts together while removing it from the pump.

DISASSEMBLY - ALL MODELS

FIGURE 3-6
To remove the pump, E-57 use a 1/4" Allen socket on the three bolts. E-46 and E-47 use a 1/2" hex socket on the three locknuts. The studs usually unscrew with the nuts.

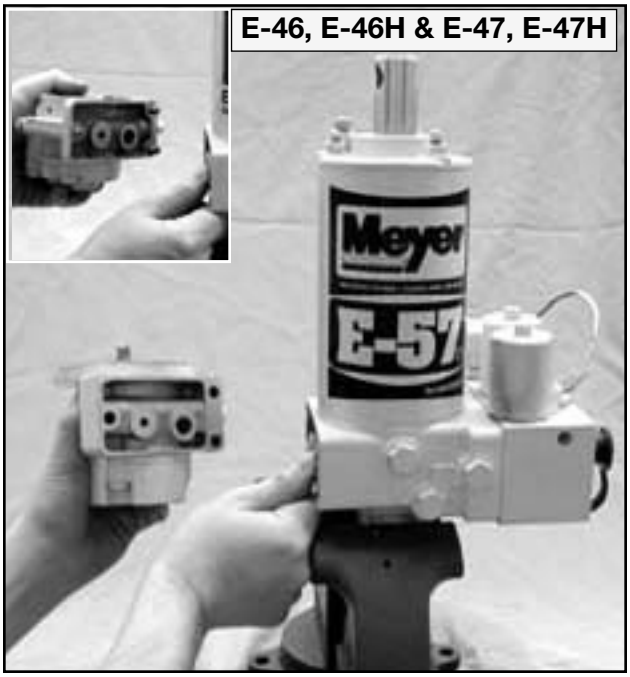


FIGURE 3-7
Pump removed from the unit base.

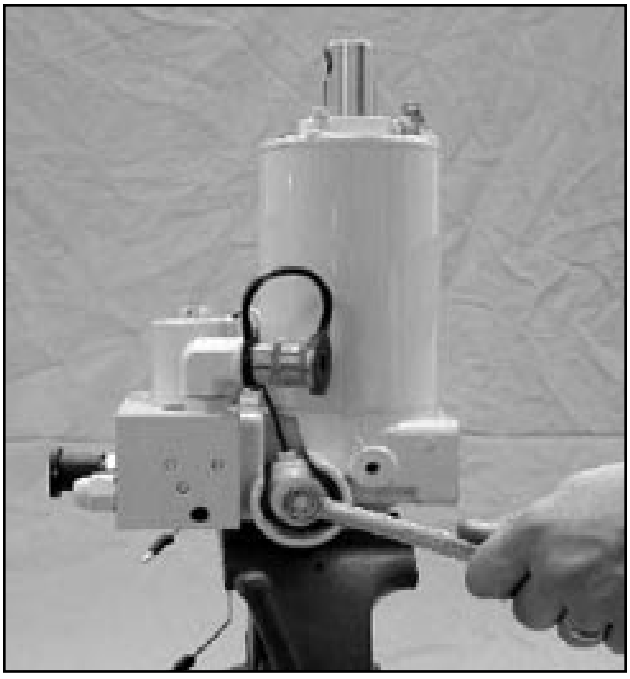


FIGURE 3-8
Remove the "A" Coil using a 3/8" or 1/2" wrench.

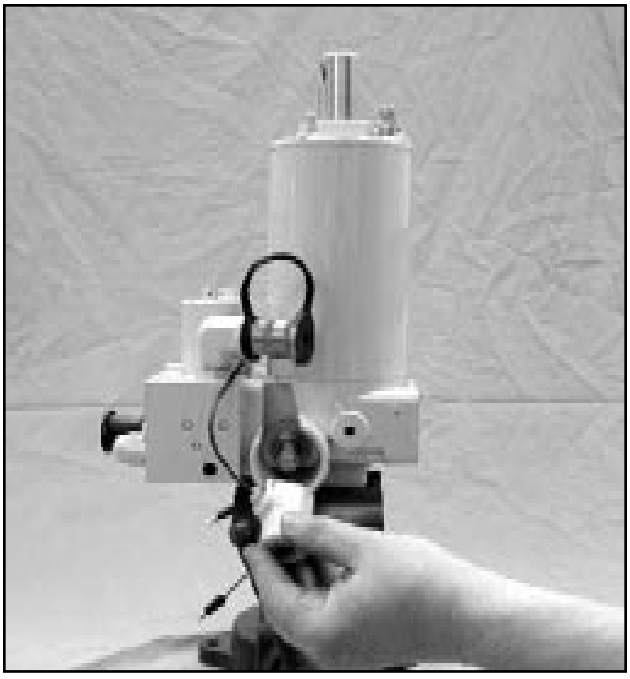


FIGURE 3-9
Coil removed from the "A" Cartridge.

DISASSEMBLY - ALL MODELS

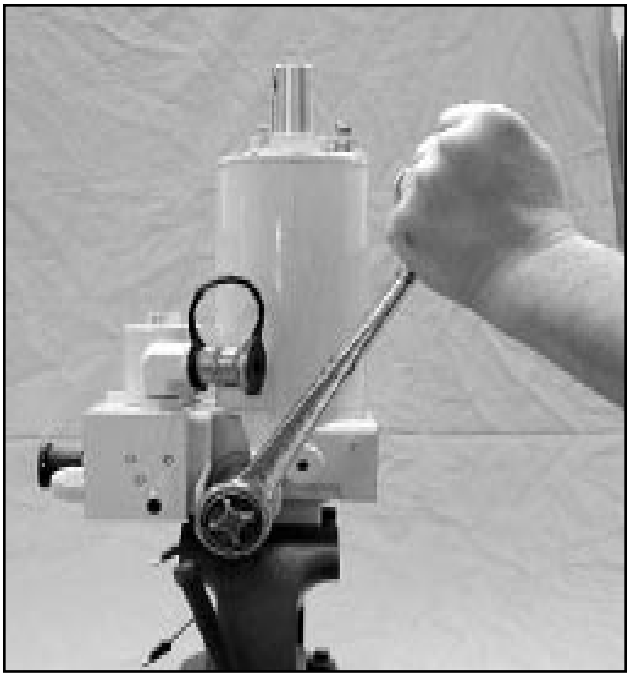


FIGURE 3-10

The “A” Cartridge is removed using a 7/8” or 1-1/8” hex deep socket.

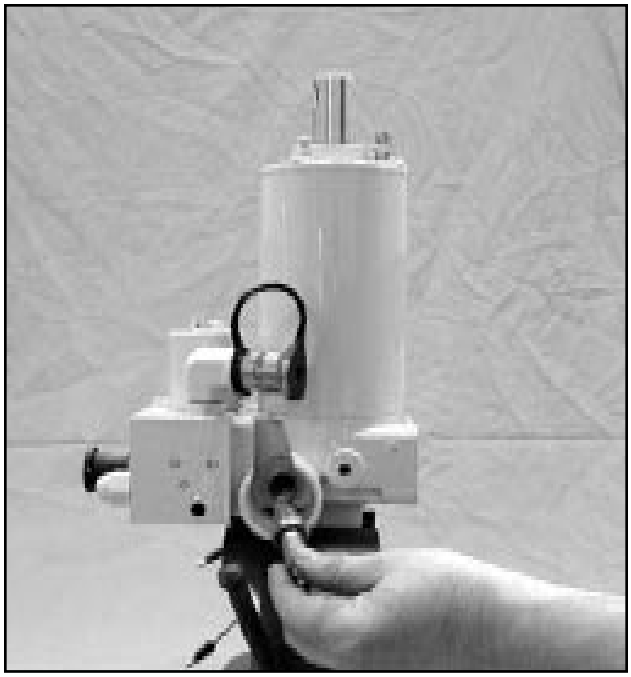


FIGURE 3-11

The “A” Cartridge is removed. Clean screen by soaking cartridge in cleaning solvent.

E-46 & E-46H ONLY

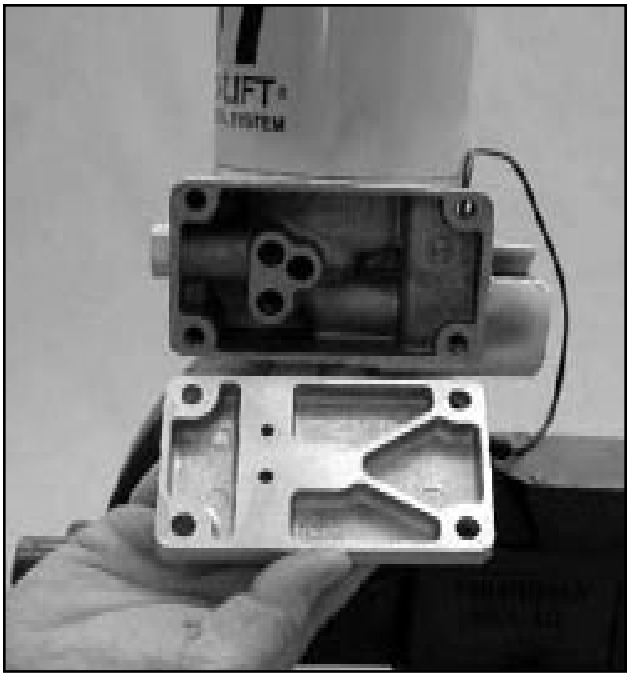


FIGURE 3-12

End plate is removed by using a 1/4” hex key on the four socket head screws. Note orientation of plate to the unit, this is critical when assembling.

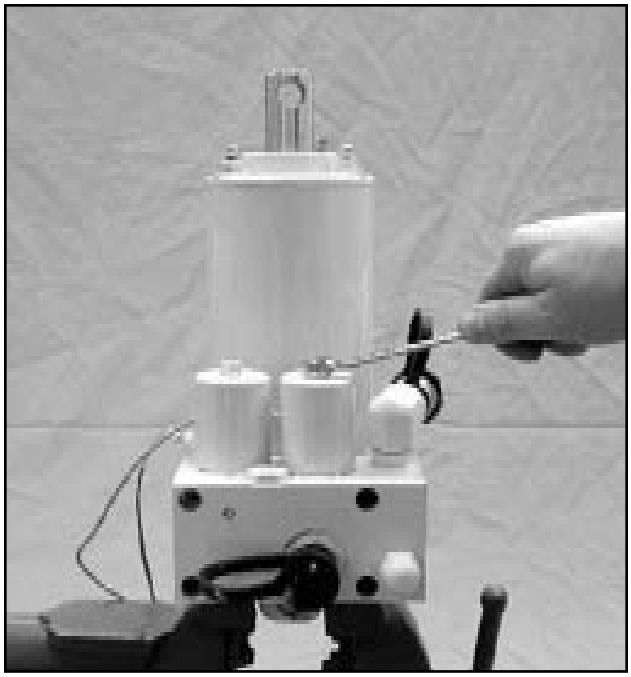


FIGURE 3-13

Remove “B” and “C” Coil by using a 7/16” Wrench on the retaining nuts.

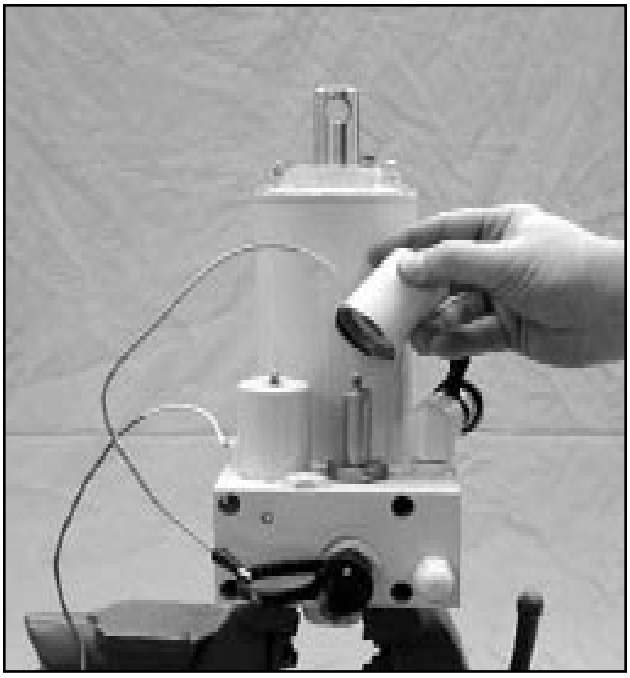


FIGURE 3-14
Coils removed from cartridges.

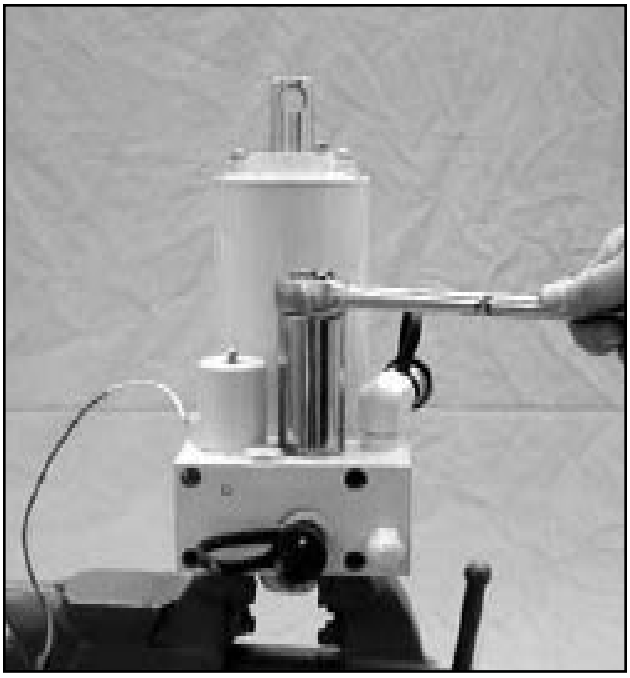


FIGURE 3-15
A special hex socket, part number 21891, may be required to remove “B” and “C” Cartridges. (See Figure 3-67)

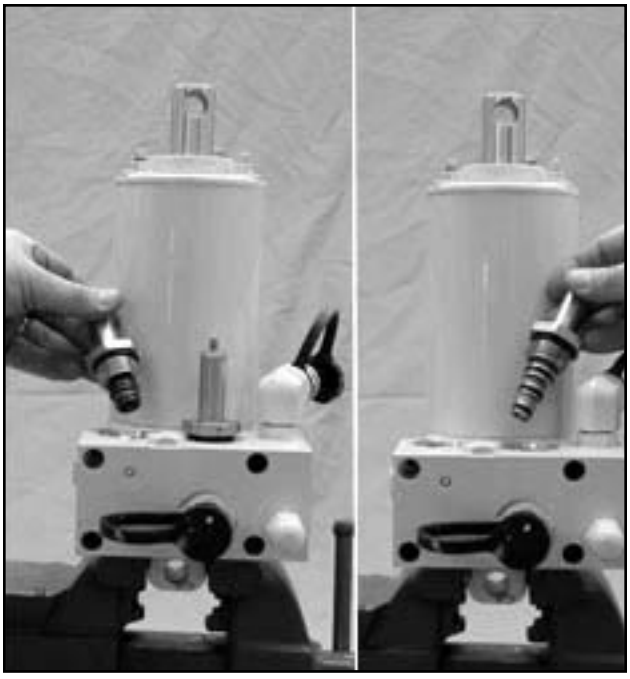


FIGURE 3-16
“B” & “C” Cartridge being removed from valve block. Clean cartridges by soaking in kerosene.

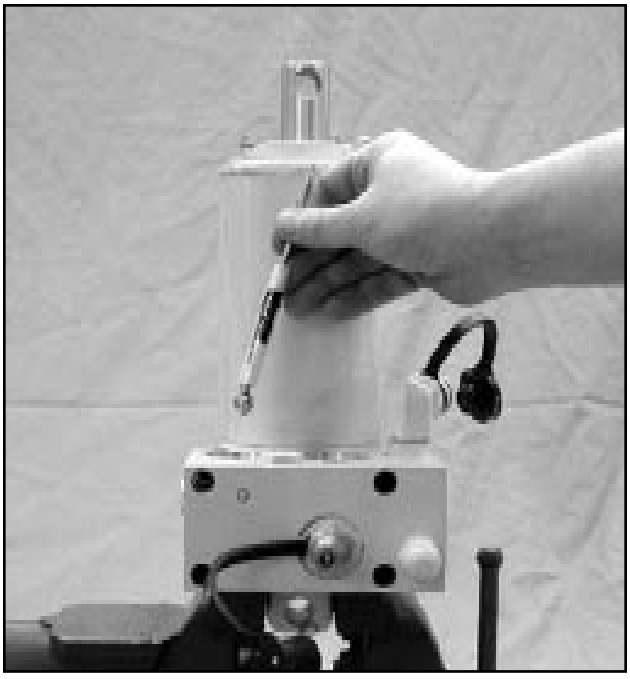


FIGURE 3-17
A magnetic probe is extremely useful for removal of small valve parts. This is the 7/16” check ball for “B” Cartridge being removed.

DISASSEMBLY - E-47 & E-57 MODELS

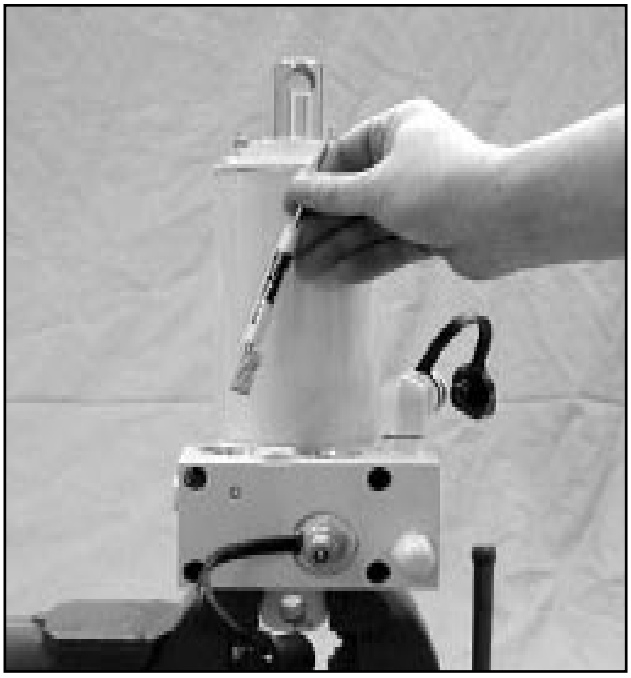


FIGURE 3-18
"B" Cartridge check spring removed.

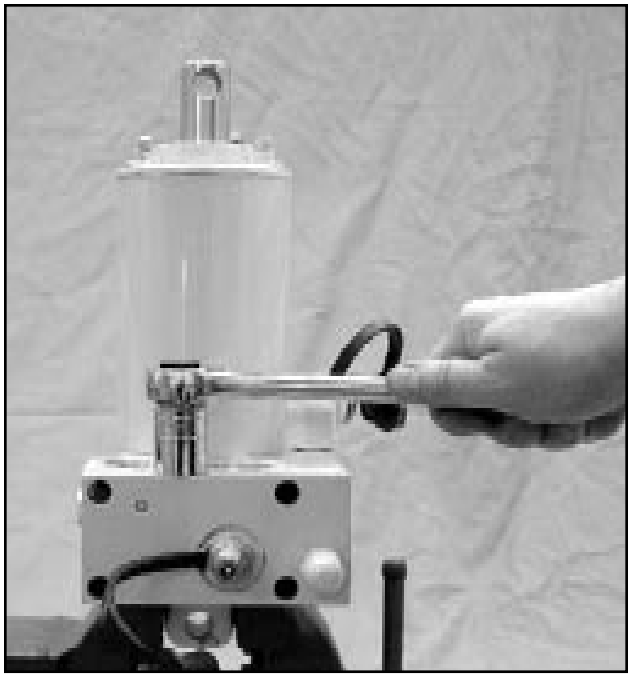


FIGURE 3-19
Use a 13/16" Hex Socket to remove pilot valve plug.

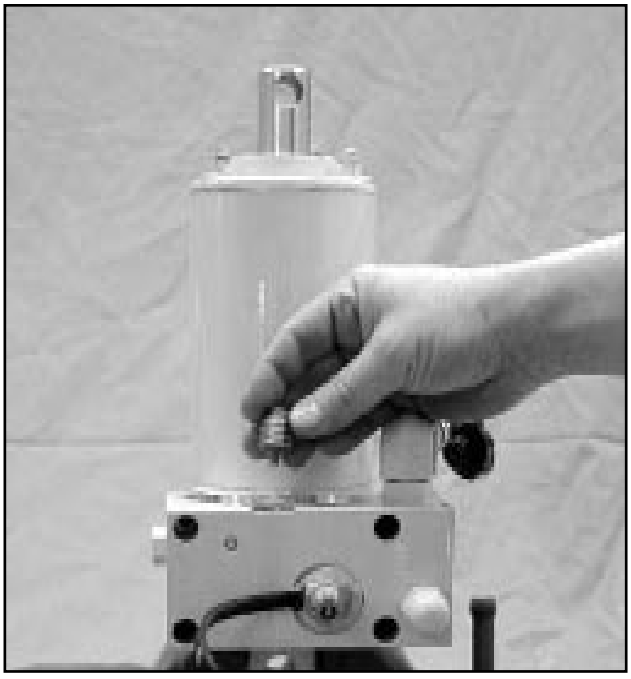


FIGURE 3-20
Pilot check piston being removed. Handle piston with care. If piston is scratched or damaged, it must be replaced.

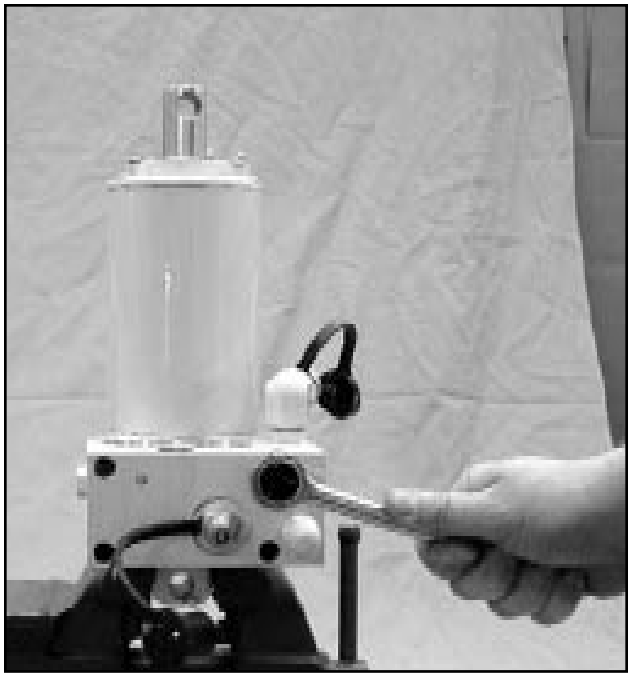


FIGURE 3-21
The valve body can be removed from unit using a 1/4" hex key or Allen Socket.

DISASSEMBLY - E-47 & E-57 MODELS

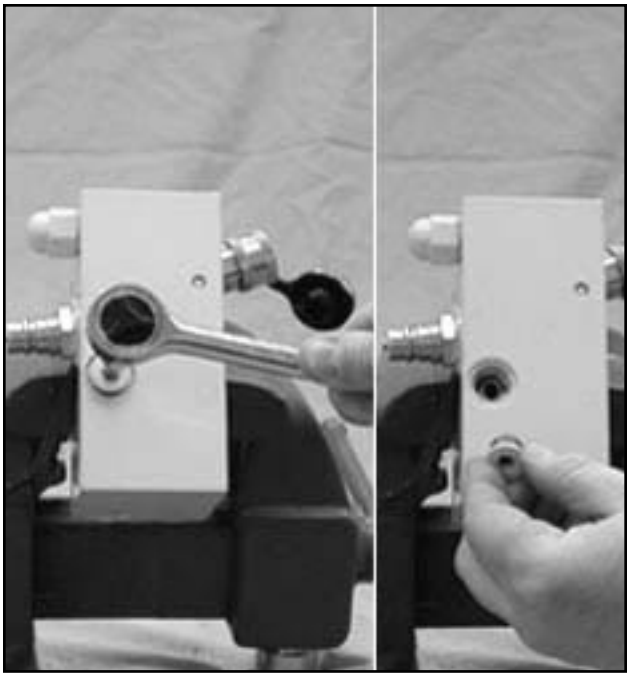


FIGURE 3-22
Use a 1/4” hex key or Allen Socket to remove pilot valve plug.

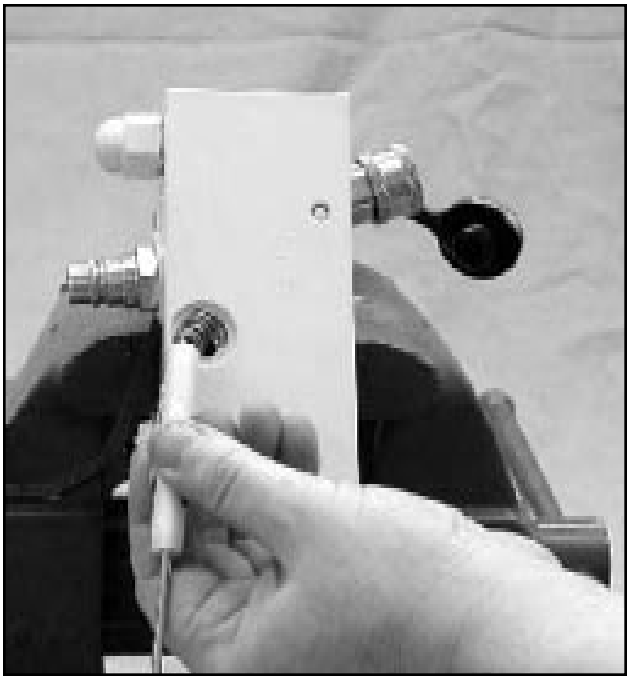


FIGURE 3-23
Pilot check spring being removed from valve body.

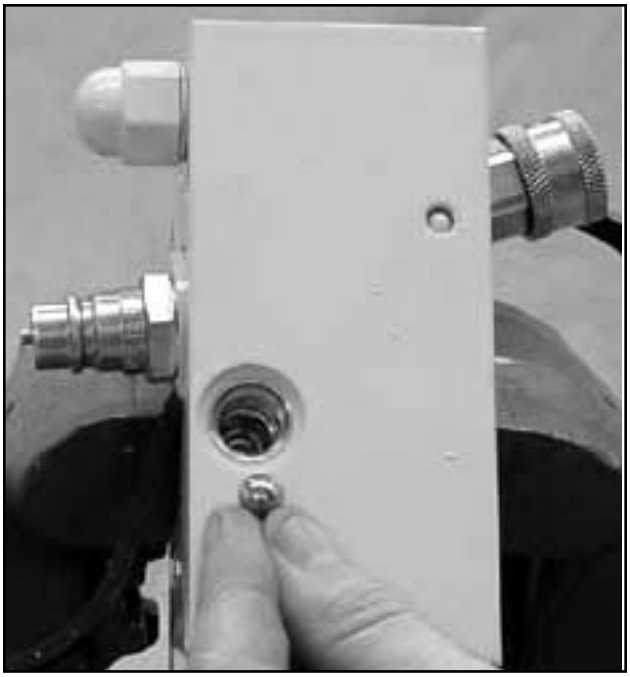


FIGURE 3-24
Pilot check ball removed. This is a 3/8” diameter steel ball.

FIGURE 3-25
There are two filters on E-47 and E-47H and one on E-46 and E-46H units. Remove filters with an 11/16” wrench.

DISASSEMBLY - ALL MODELS

FIGURE 3-26
Filters removed; soak in kerosene before reassembling.

FIGURE 3-27
Before removing ram and piston assembly, extend rod fully. This drains out remaining oil in cylinder.

FIGURE 3-28
When disassembling the reservoir-cylinder assembly use a 1/2” hex socket to remove the lock nuts. The studs usually unscrew from the base with the nuts.

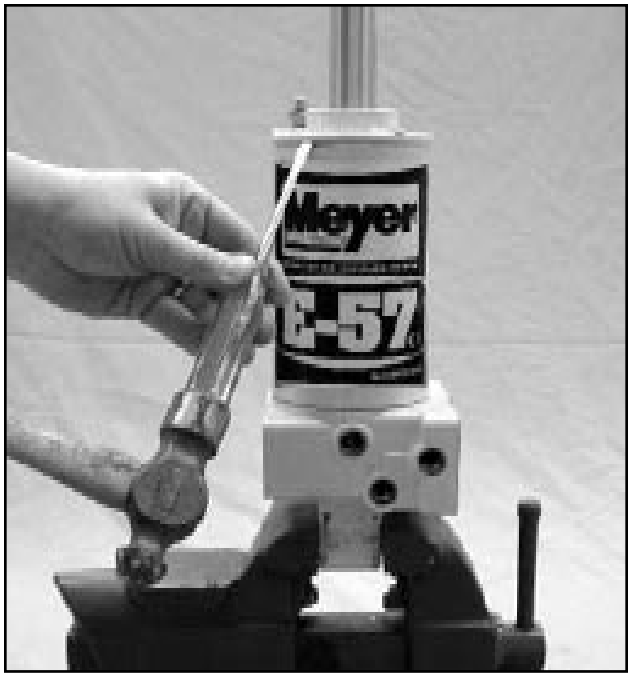


FIGURE 3-29
Cover is removed from reservoir using a large screw driver and hammer or mallet as shown, tapping lightly around the top cap.

FIGURE 3-30

Remove ram and cylinder assembly from reservoir then pull ram out of cylinder. Worn packing cup on piston should be replaced if cloth backing is visible.

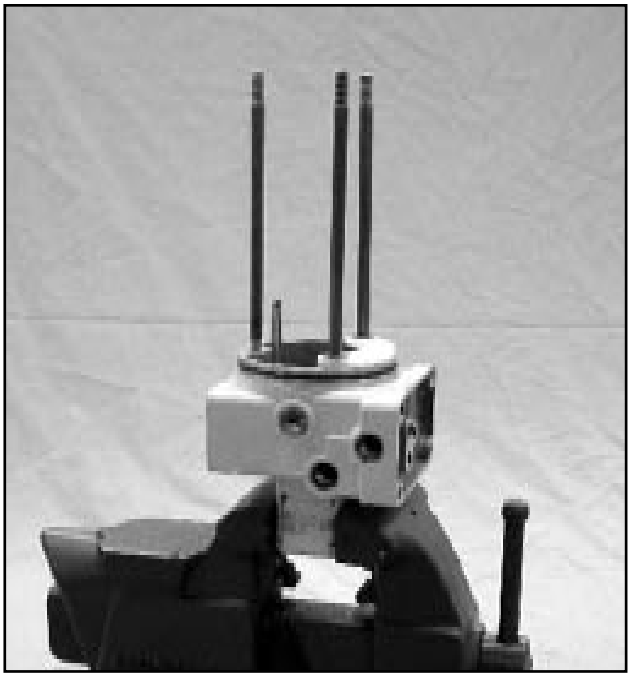


FIGURE 3-31

Remove nuts, baffle and retainer rings from studs and screw the studs into the base. Clean reassemble Sump Base (30) in reverse order.

REASSEMBLY - ALL MODELS

FIGURE 3-32

Clean all paint from ram then slide the cylinder over the ram piston assembly using a rubber or leather mallet.

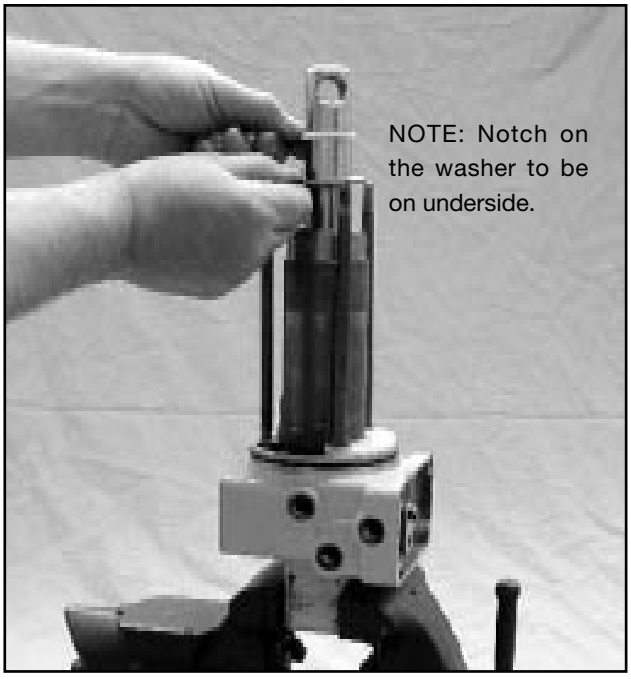


FIGURE 3-33

Install cylinder assembly carefully being certain it seats squarely on “O” ring in base. Assemble O-Ring (13) and Washer (21) as shown.

REASSEMBLY - ALL MODELS

FIGURE 3-34
Reinstall reservoir using mallet to seat reservoir squarely.

FIGURE 3-35
Install cover assembly using mallet to seat cover, making certain filter plug is properly located.

FIGURE 3-36
Drain plug and filters to be torqued to 75-85 in. lbs. with an 11/16” hex socket. Remove nuts from pump studs and screw into base.

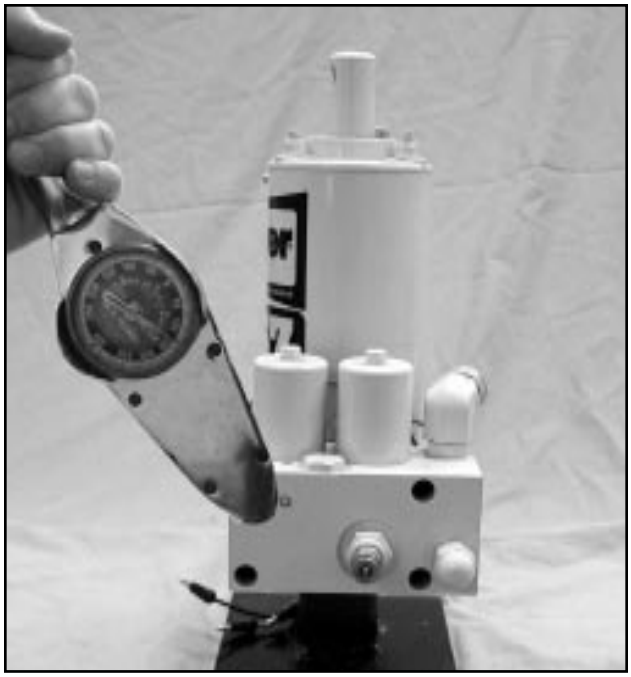


FIGURE 3-37
Torque the bolts to 100-125 in. lbs. using a 1/4” hex key or Allen Socket.

REASSEMBLY - ALL MODELS

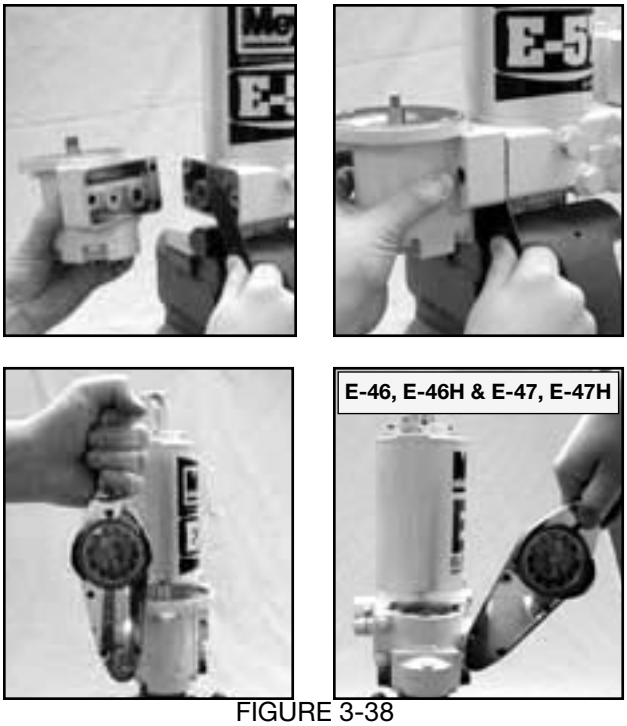


FIGURE 3-38

Use a flat tool to hold the pump check valve in place and assemble pump. Torque the pump to 100-125 in. lbs. On the E-57 use a 1/4" Allen socket on the bolts and on the E-46 and E-47 use a 1/2" hex socket on the locknuts.

FIGURE 3-39

To reinstall motor, align pump shaft quill and motor shaft with appropriate bolt holes. Use a 10mm hex socket on the E-57 and a 3/8" hex socket on the E-46 and E-47.

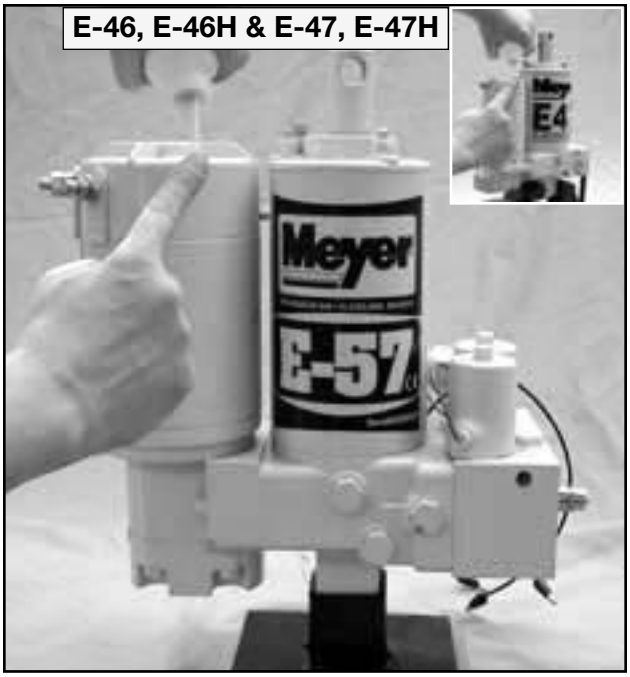


FIGURE 3-40

Torque cap screws to 45 - 55 in. lbs. using a 3/8" (E-47) or 10mm (E-57) hex socket, then apply Permatex Form-A-Gasket No. 2 or equivalent sealant around each cap screw head.

FIGURE 3-41

Follow instructions under "Replacement of Hydraulic Fluid"

See POST SEASON MAINTENANCE on page 3

CROSSOVER RELIEF VALVE DISASSEMBLY

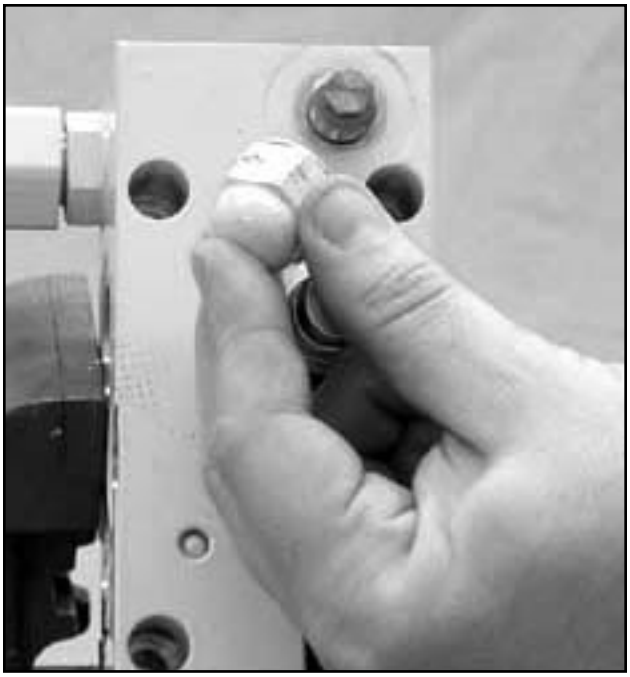


FIGURE 3-42

Remove Acorn Nut (61), O-ring (60) using a 15/16” open end wrench.

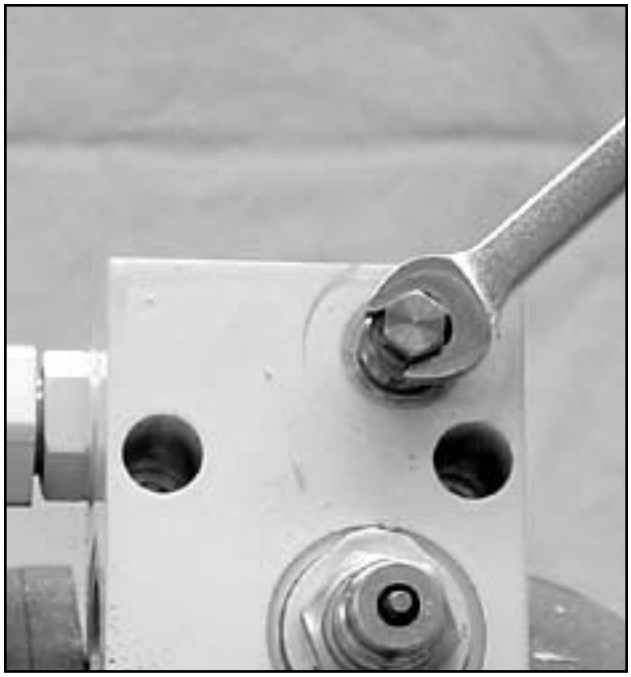


FIGURE 3-43

Remove Plug (58) and adjusting Screw (59) using a 3/8” open end wrench.

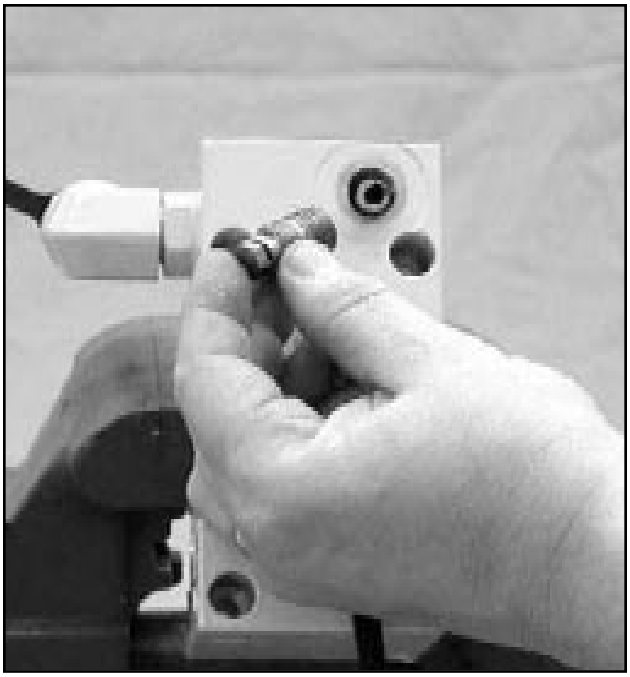


FIGURE 3-44

Remove Plug (58), Adjusting Screw (59) and Disc (57).

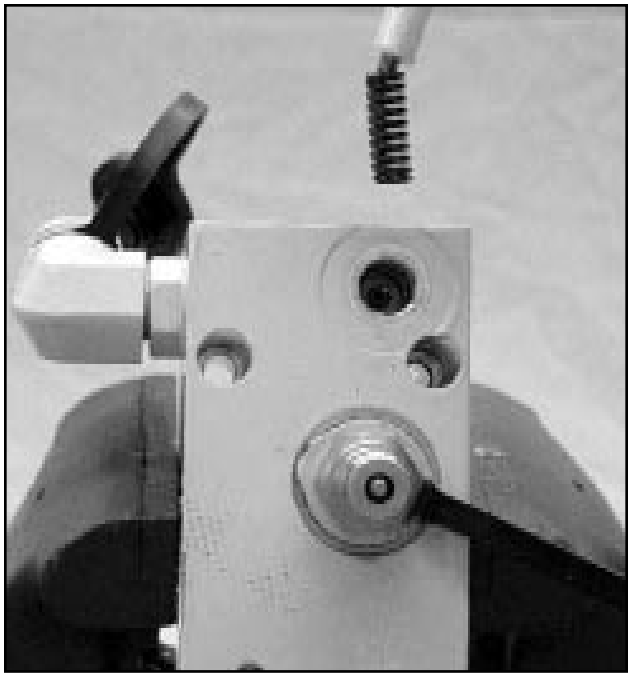


FIGURE 3-45

Remove Pressure Spring (55)

CROSSOVER RELIEF VALVE DISASSEMBLY

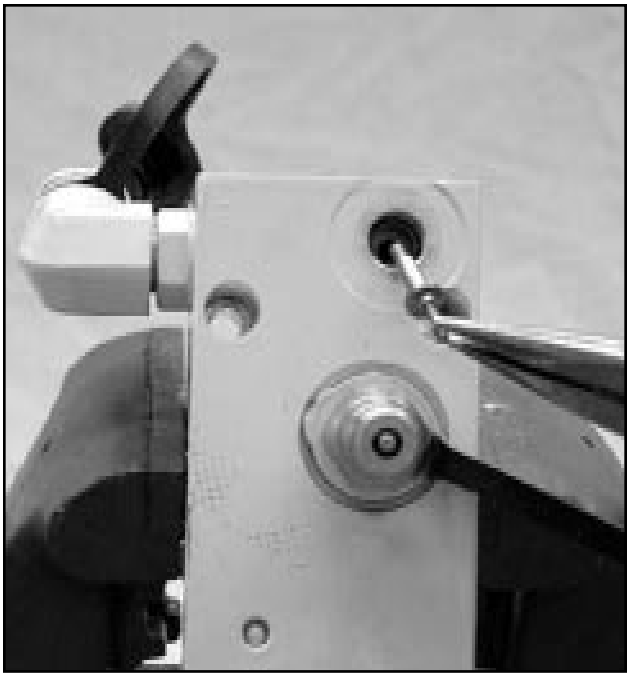


FIGURE 3-46
Remove Poppet (52), Guide (54), Washer (53), Spacer (56).

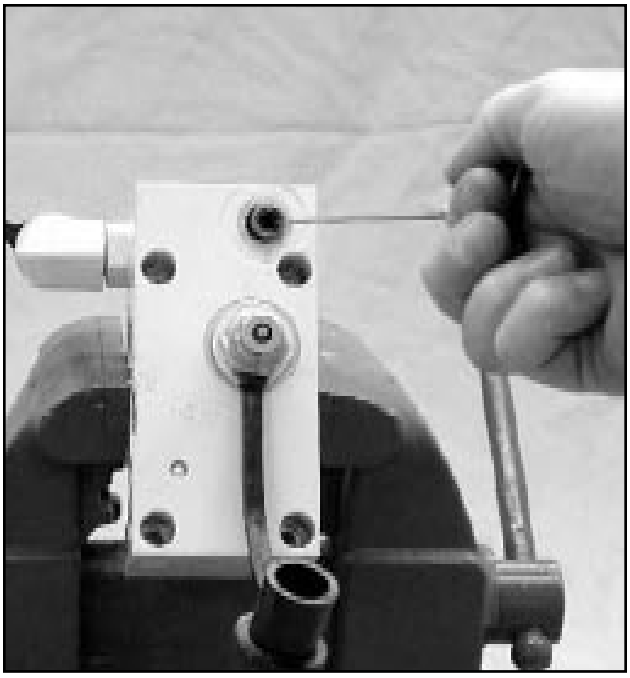


FIGURE 3-47
Remove Cage (50), O-ring (49) using special tool.

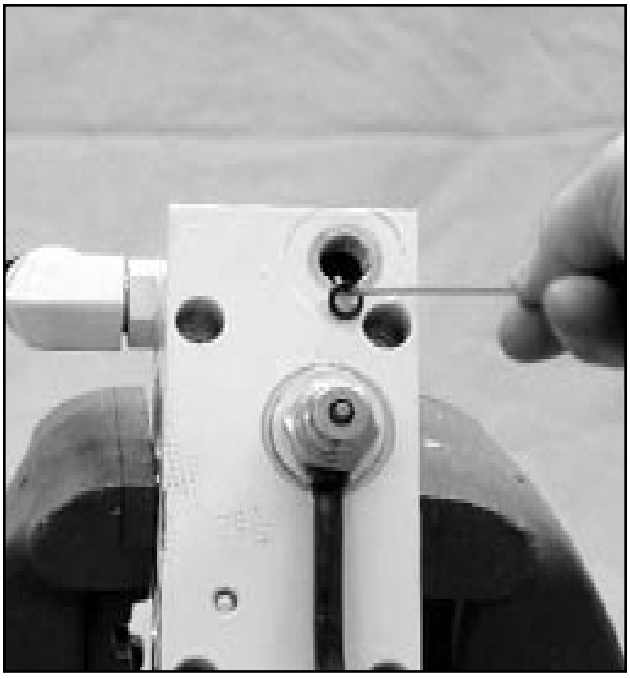


FIGURE 3-48
Remove bottom O-ring (48) using special tool.

CROSSOVER RELIEF VALVE REASSEMBLY

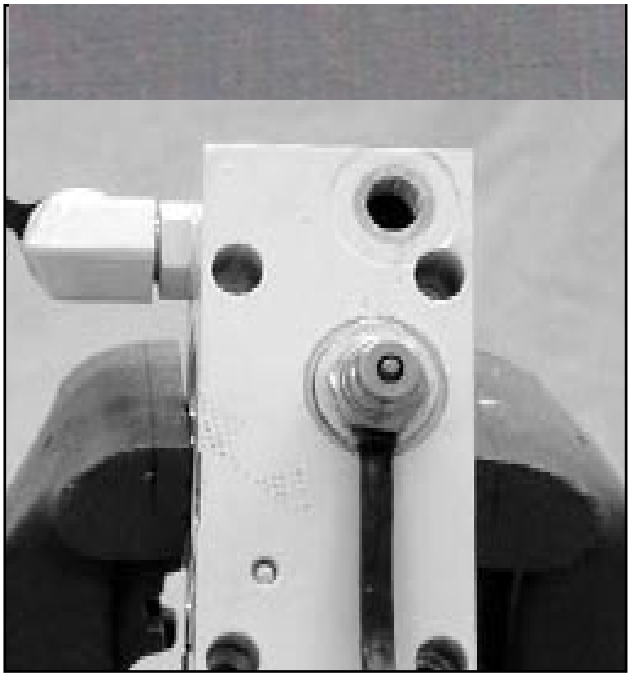


FIGURE 3-49

Correct order when reassembling Crossover Relief Valve (47). Note: All parts should be dipped in oil prior to their assembly.

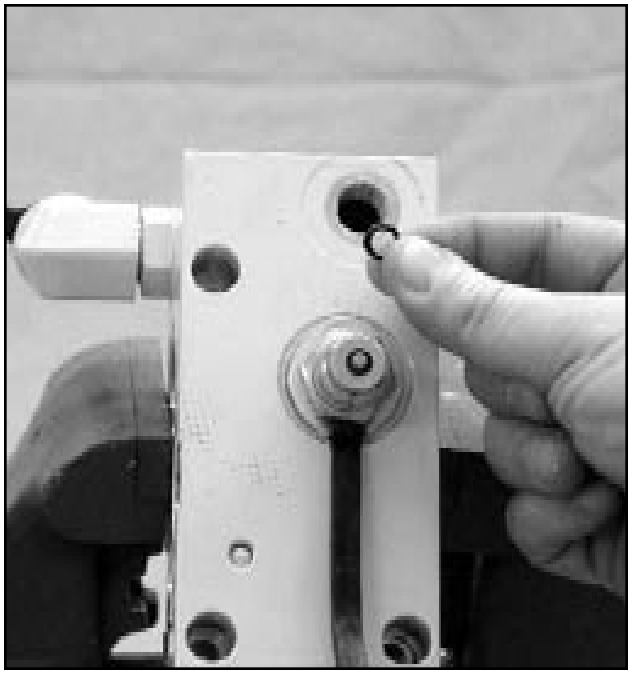


FIGURE 3-50

Reinstall O-ring (48) making certain it is seated to the bottom of the cavity.

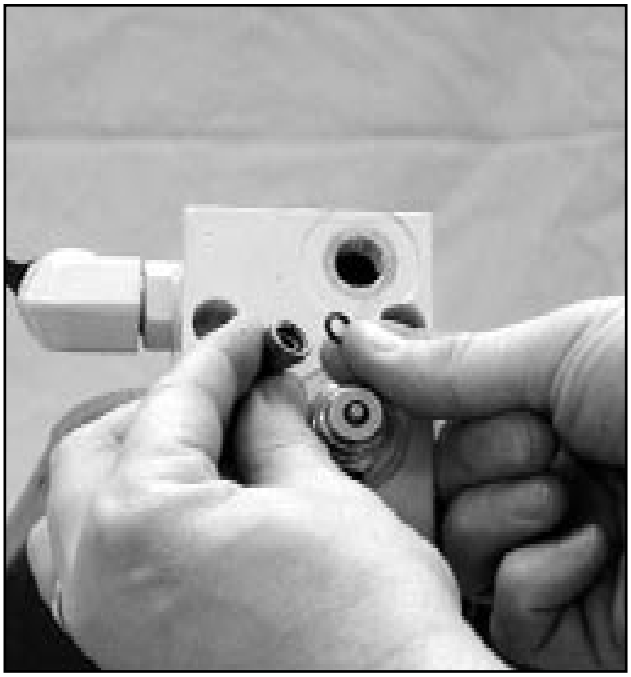


FIGURE 3-51

Install small O-ring (51) into top of cage (50).

FIGURE 3-52

Install small bushing (51) onto poppet (52).

CROSSOVER RELIEF VALVE REASSEMBLY

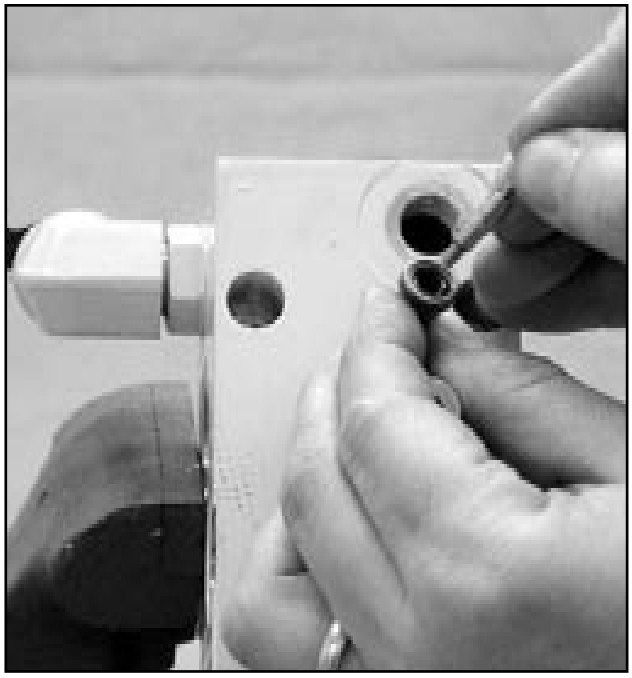


FIGURE 3-53
Assemble Poppet with bushing into Cage as shown.

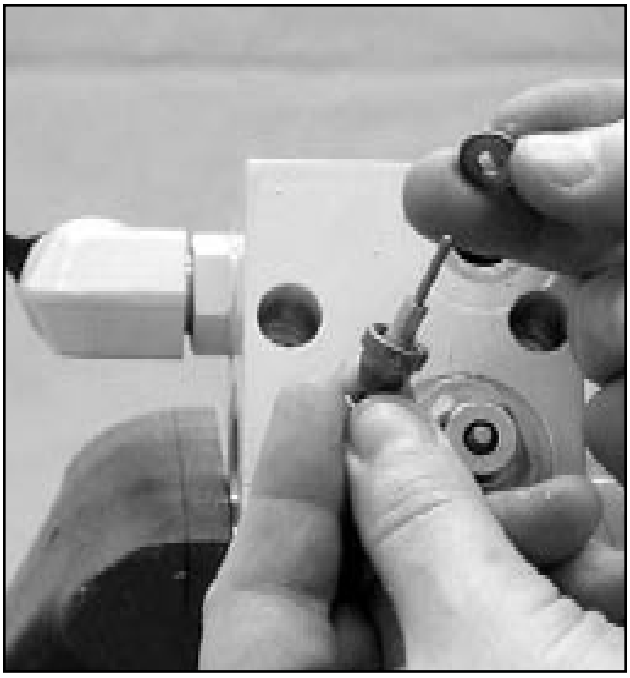


FIGURE 3-54
To install Bushing (51), assemble Washer (53) onto the Poppet as shown. Press Washer down on Cage, this will put equal pressure on the Bushing. Hold Washer (53) in place then remove Poppet from Cage.

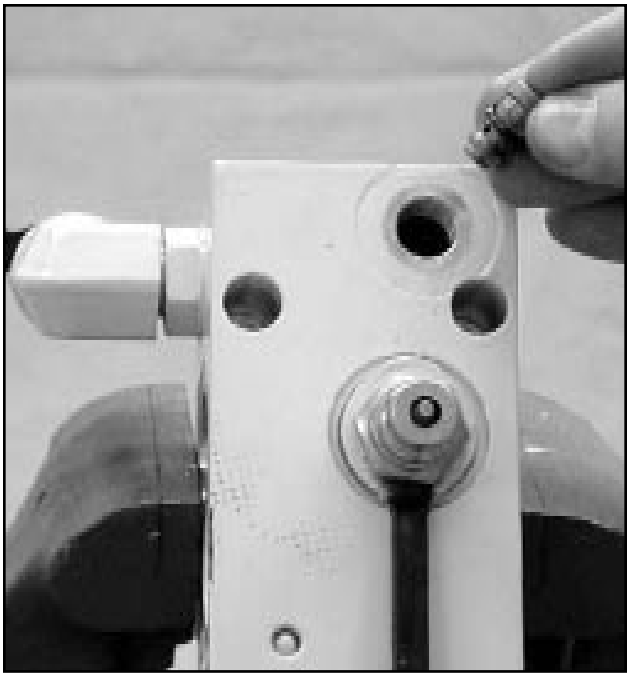


FIGURE 3-55
Slide O-ring (49) over bottom of Cage. **DO NOT** push O-ring completely onto shoulder of Cage. Drop Cage assembly into block cavity.

FIGURE 3-56
Seat Cage assembly (50) to the bottom of the block cavity using a Drift Pin of approximately the same diameter. Tap Drift Pin lightly with a hammer until Cage assembly bottoms out and seals against O-rings (48) and (49).

CROSSOVER RELIEF VALVE REASSEMBLY

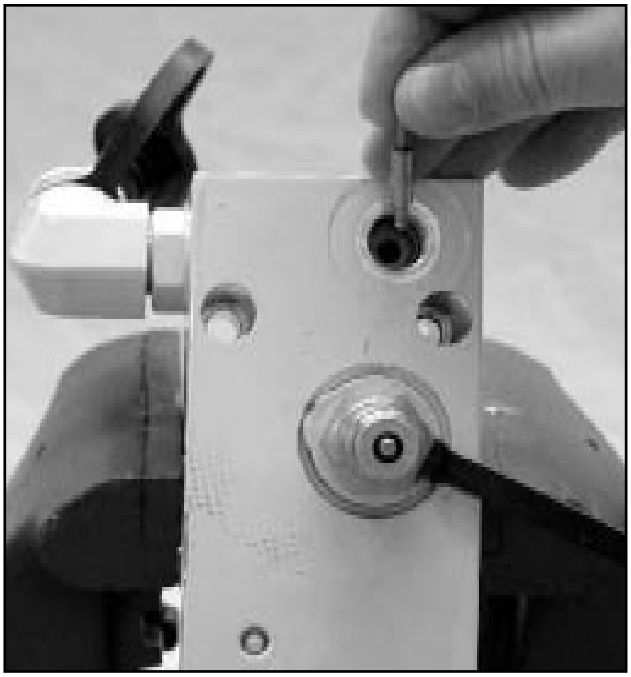


FIGURE 3-57
Reassemble Poppet (52) into Cage.

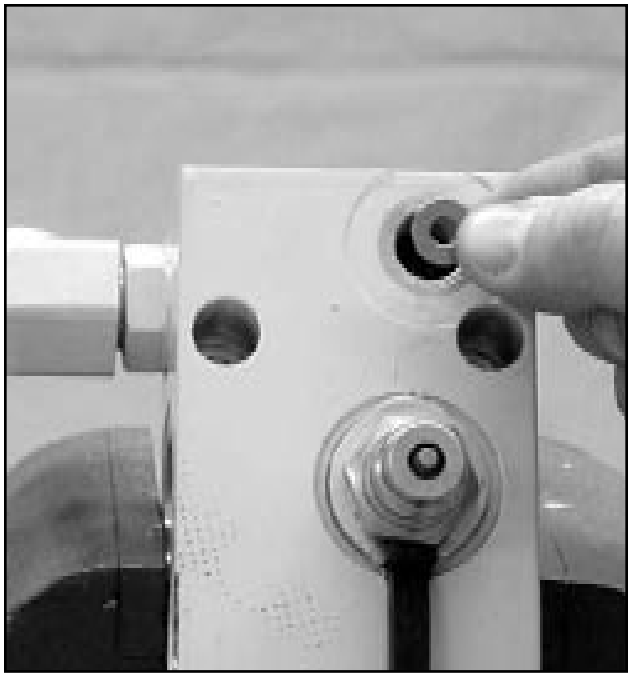


FIGURE 3-58
Reassemble Washer (53) smooth side up.

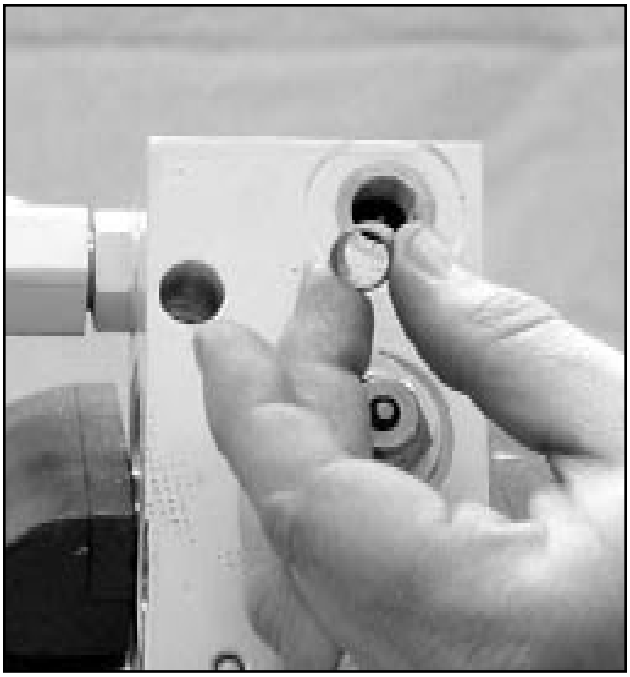


FIGURE 3-59
Assemble Spacer (56).

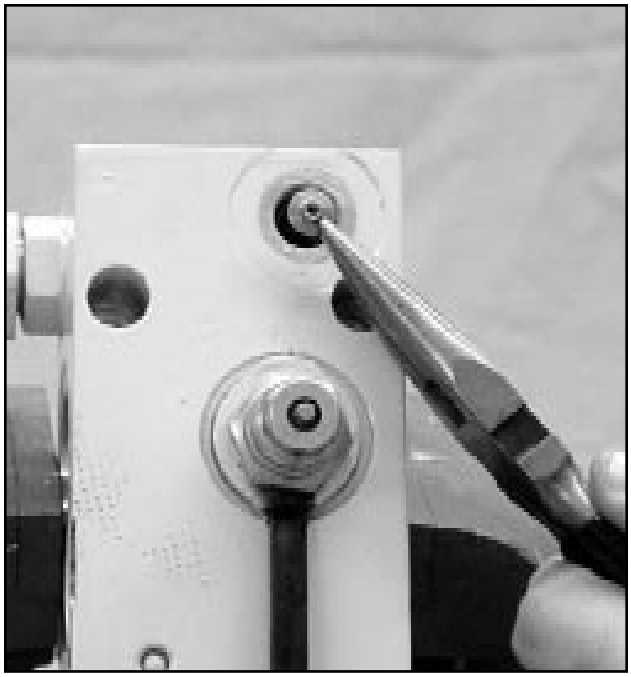


FIGURE 3-60
Reassemble Spring guide (54) smooth side down.

CROSSOVER RELIEF VALVE REASSEMBLY

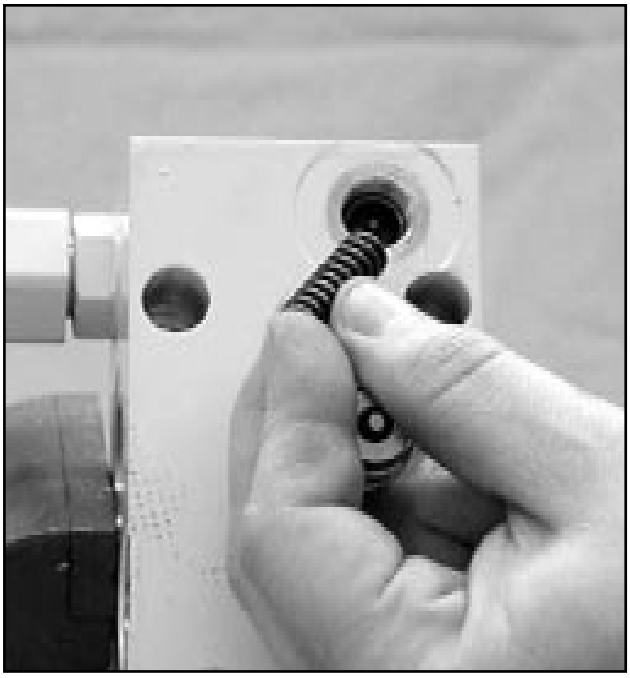


FIGURE 3-61
Reassemble Spring (55).

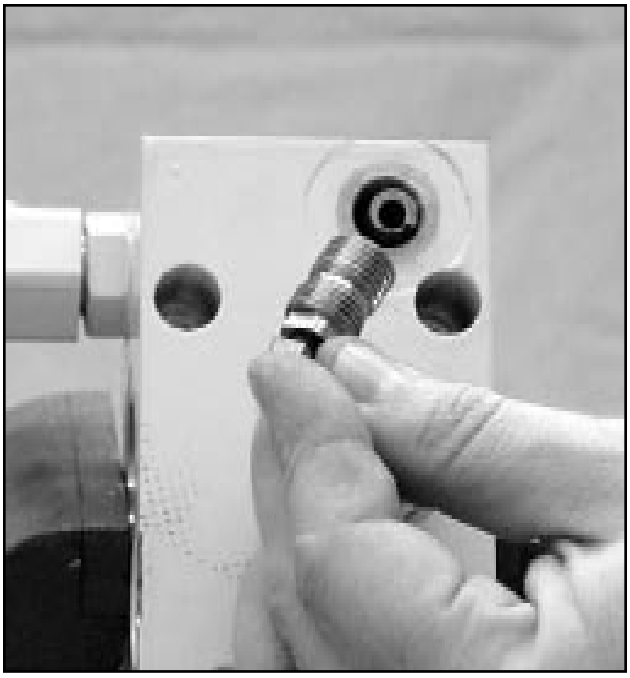


FIGURE 3-62
Reassemble Plug (58) with Adjusting Screw (59) and disc (57).

FIGURE 3-63

To properly adjust the Crossover Relief Valve refer to page 21. Push leading edge of the Moldboard against an immovable object until Crossover Relief Valve opens. (3800 P.S.I. $\pm$ 400). Reassemble Acorn Nut (61) and O-ring (60).

BRUSH REPLACEMENT OF AMERICAN BOSCH MOTOR

FIGURE 3-64

A special tool figure 3-69 is required to hold brushes in motor top cap as shown.

FIGURE 3-65

Once top cap is positioned over armature shaft, carefully slide tool out while pushing down on cap.

BRUSH REPLACEMENT OF ISKRA MOTOR

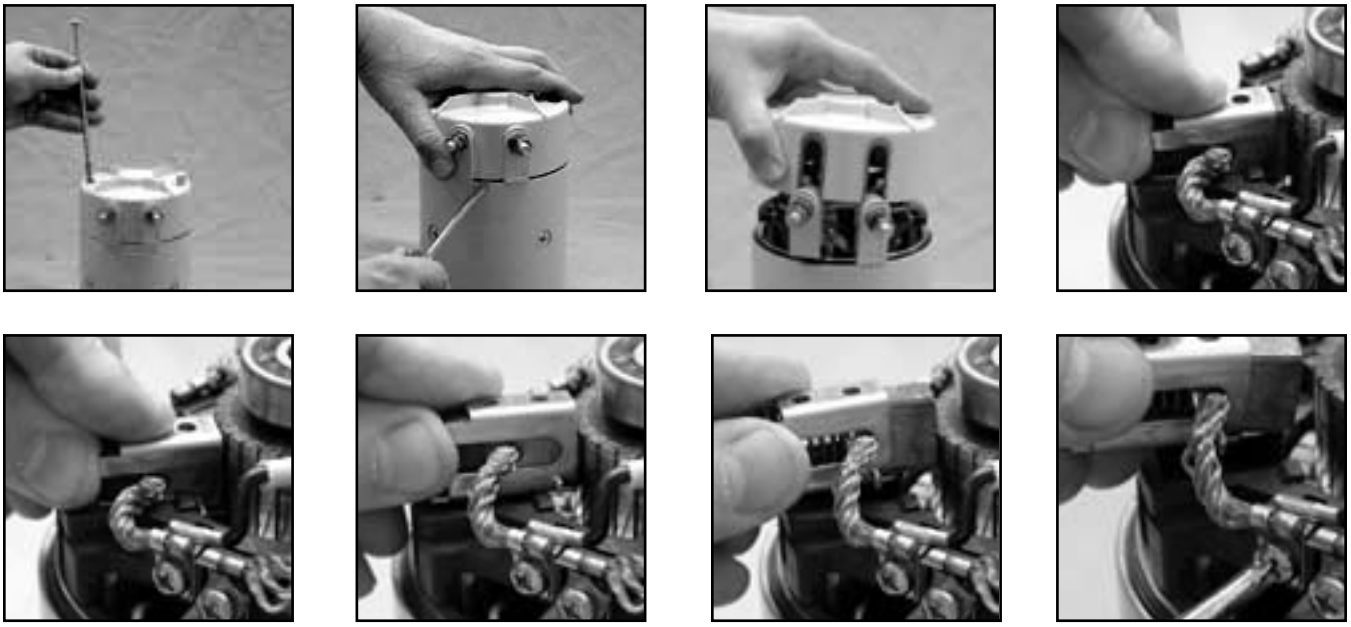


FIGURE 3-66

Remove motor from hydraulic unit. Remove top cap from motor housing. To replace brushes (part # 15854) start by pushing each brush assembly towards the commutator. Remove old assembly from the insulated mounting plate, removing retaining screws. Replace with a new brush assembly by reversing the above procedure. It is recommended that each brush be changed in turn to avoid confusion, make sure that each brush assembly is replaced with the correct part that has the brush cable on the the same side. Service Kits consist of 2 matching pairs of brush assemblies.

BRUSH REPLACEMENT

American Bosch Brush Replacement

1. The commutator end cap is removed by removing the hex head cap screws as shown in Figure 3-4

2. While holding the motor in position on the pump, remove the commutator end cap.

3. Remove the existing brush assemblies and brush springs.

4. Install the replacement brush assemblies, making certain that the leads do not contact the commutator end cap or commutator and that the chamfered sides of the brushes are away from the springs. Also install the replacement springs.

5. Tighten the brush holder screws to 35-40 in. lbs.

6. Tighten the motor terminal nut to 50-60 in. lbs., and the lock nut to 3-5 in. lbs.

7. Apply a thin film of American Bosch LU3001 grease or equivalent to the armature shaft where it contacts the end cap bearing.

8. Properly position the gasket and reinstall the commutator end cap as shown in Figures 3-64 and 3-65.

9. Torque the cap screws and seal the cap screw heads as shown in Figure 3-40.

Iskra Brush Replacement

See Figure 3-66

VALVE CARTRIDGES "A", "B" and "C"

IMPORTANT: The valve cartridges can be damaged beyond repair by bending or denting the tube, the portion of the cartridge surrounded by the coil. Therefore, do not grip the cartridge tube with pliers or clamp it in a vise.

"A" Cartridge

NOTE: Use only a 7/8" or a 1-1/8" hex deep socket to remove and reinstall the "A" Cartridge.

The "A" Cartridge cannot be disassembled. When operating normally, the poppet can be pushed in approximately .030".

Jamming of the poppet due to metal chips or other contamination can usually be eliminated by immersing the entire cartridge in clean kerosene and pushing the poppet in and out with a probe until it moves freely. Dry with compressed air and reinstall.

In the event jamming cannot be eliminated, replace the cartridge.

"B" and "C" Cartridges

NOTE: Cartridges without a hex nut must use special tool No. 21891 to remove and reinstall the "B" and "C" Cartridges. See Figure 3-67

When jamming of the spool occurs, attempt to eliminate it using the method described under "A" Cartridge before disassembling it.

The "B" and "C" Cartridges can be disassembled by removing the internal retaining ring. When operating normally, the spool can be pushed in approximately .070". However, it is generally a better use of one's time to replace the cartridge.

In the event jamming or some other malfunction cannot be eliminated, replace the cartridge since individual parts for it are not available.

SPECIAL TOOLS

FIGURE 3-67
"B" and "C" Cartridge Tool, #21891.

Crossover Relief Valve

Inner Harden Steel Wire from a Throttle/Choke cable

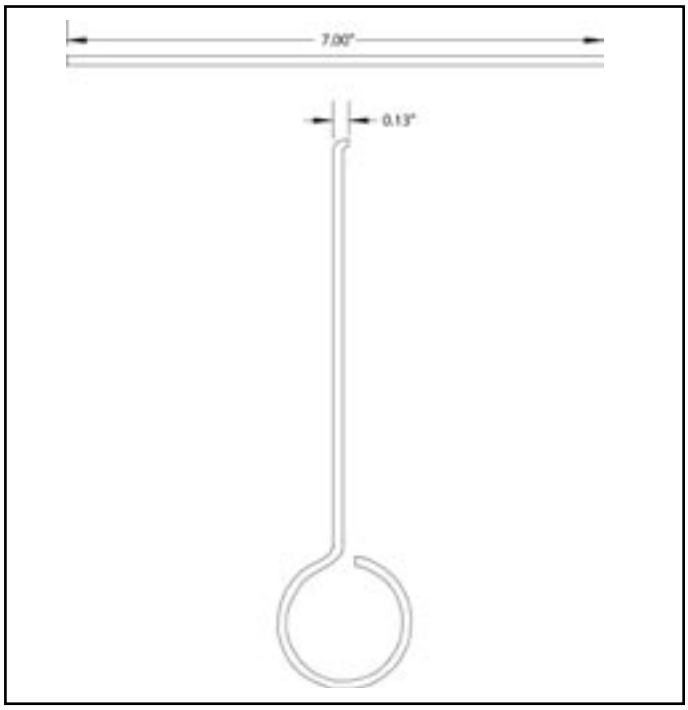


FIGURE 3-68

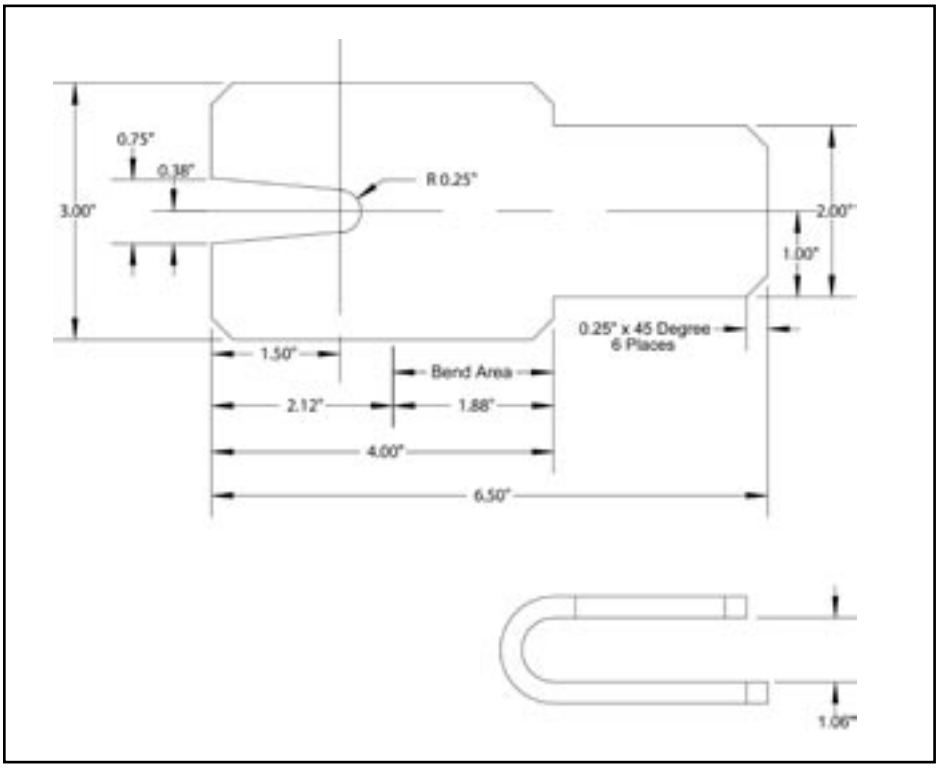


FIGURE 3-69
Brush holder tool for American Bosch Motor.

SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

MOTOR

American Bosch M0551046A

No load (motor not attached to pump)

NOTE: Do not operate motor continuously for more than 30 seconds.

Applied Voltage	12 Volts DC
Max. Current Draw	24 Amperes
Speed (Min.)	5900 RPM

Under load (pump operating in relief)

NOTE: Do not operate motor continuously for more than 5 seconds.

Applied Voltage	12 Volts DC
Max. Current Draw	230 Amperes

ISKRA AMJ4739 12V.

No load (motor not attached to pump)

NOTE: Do not operate motor continuously for more than 30 seconds.

Applied Voltage	12 Volts DC
Max. Current Draw	150 Amperes
Speed (Min.)	3,200 RPM

Under load (pump operating in relief)

NOTE: Do not operate motor continuously for more than 5 seconds.

Applied Voltage	12 Volts DC
Max. Current Draw	230 Amperes

SOLENOID VALVES "A", "B" AND "C"

"A" Coil

Applied Voltage	**12 Volts DC**
Current Draw	**1.2 Amperes**

Nominal resistance (ohm meter lead connected to coil lead, other meter lead connected to metal coil cover) 9.6 ohms ± 10% Plastic cover Coil 10.0 ohms ± 10%

"B" and "C" Coils

Applied Voltage	12 Volts DC
Current Draw	1.24 Amperes

Nominal resistance (ohm meter lead connected to coil lead, other meter lead connected to metal coil cover) 3.73 ohms ± 3%.

SOLENOID SWITCH

Applied Voltage	**12 Volts DC**
Max. Current Draw	**5 Amperes**

Nominal resistance (ohm meter lead connected to coil lead, other meter lead connected to metal foot) 2.65 to 4.5 ohms.

HYDRAULIC SPECIFICATIONS

PUMP - Pressure Output

E-46, E-47	**(Relief Valve setting) I.**	**1650 ± 50 P.S.**
E-57	**Non Adjustable**	**2000 P.S.I.**

CROSSOVER RELIEF VALVE

Opening Pressure	**3800 ± 400 P.S.I.**

HYDRAULIC FLUID CAPACITY

NOTE :1 Quart = 32 Fluid Ounces

Model E-46	27 oz.
Model E-46H	1 qt., 3.5 oz. (35.5 oz.)
Model E-47 & E-57	
Unit	28 oz.
Hoses & 1-1/2 x 10 Cylinders	16 oz.
Total	1 qt., 12 oz. (44 oz.)
Model E-47 & E-57	
Unit	28 oz.
Hoses & 1-1/2 x 12 Cylinders	19 oz.
Total	1 qt., 15 oz. (47 oz.)
Model E-47H & E-57H	
Unit	1 qt., 4.5 oz. (36.5 oz.)
Hoses & 2 x 12 Cylinders	28 oz.
Total	2 qt., .5 oz. (64.5 oz.)
Model E-57H (MDII)	
Unit	1 qt., 4.5 oz. (36.5 oz.)
Hoses & 1-1/2 x 10 Cylinders	16 oz.
Total	1 qt., 20.5 oz. (52.5 oz.)

TORQUE SPECIFICATIONS

	Thread Size	Torque (In. Lbs.)
Reservoir Cover		
Retaining Nuts	5/16-24	100-125
Pump Assembly		
Retaining Nuts/Cap Screws	5/16-24	100-125
End Plate or Valve Block		
Retaining Cap Screws	5/16-18	96-120
Motor to Pump Retaining		
Cap Screws	1/4-20	45-55
Drain and Filter Plugs	1/2-20	75-85

Meyer®
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MODELS
E-46, E-46H
E-47, E-47H
E-57, E-57H

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